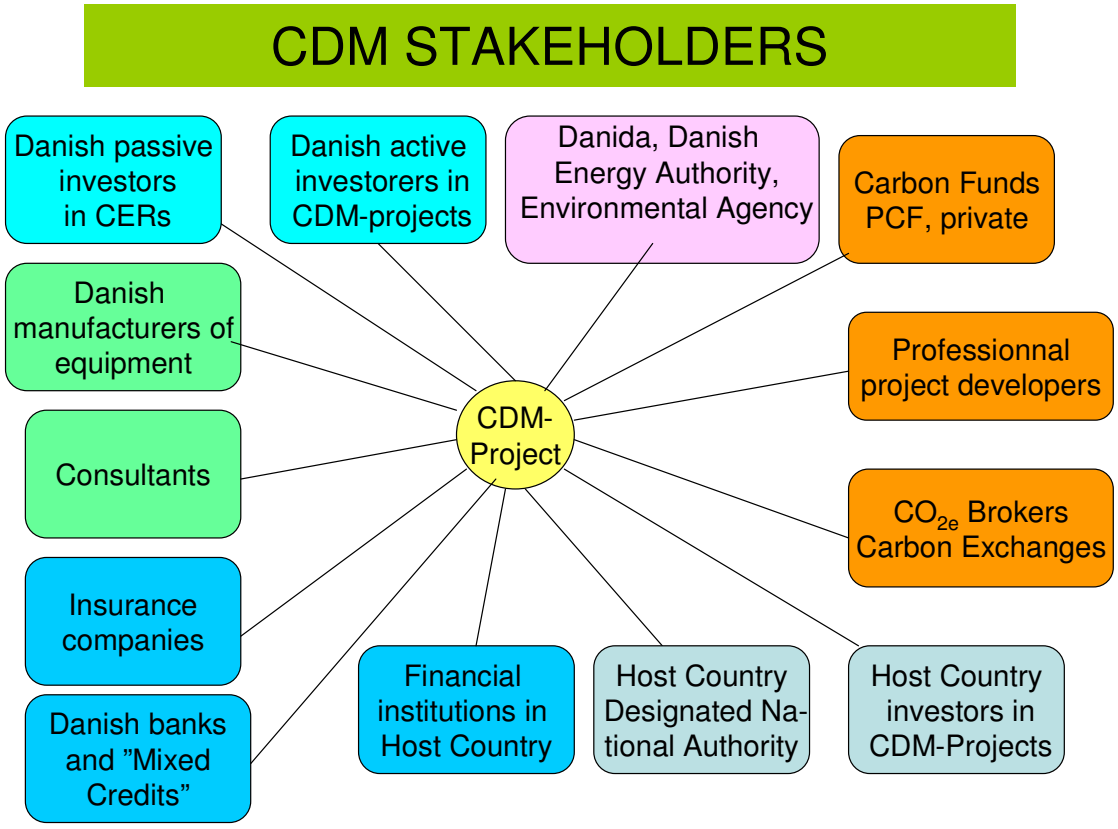
# Danish Energy Agency

## CDM Projects: Opportunities for Danish Industry

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Wolfgang Mostert Associates

# Table of Content


Glossary ..... 4
INTRODUCTION: OBJECTIVE OF THE REPORT ..... 7
1 THE DEMAND SIDE FOR CDM-PROJECTS ..... 10
1.1 What Scope for Credit Purchases is given Danish Climate Strategy? ..... 10
1.2 What Scope for Credit Purchases results from the EU's Emissions Trading Directive? ..... 11
1.3 How many Credits will be purchased by Government and Industry respectively? ..... 12
1.4 Institutional Framework for CDM ..... 13
1.4.1 Concession regime for international GHG-emissions ..... 13
1.4.2 Trading of Emission Allowances: the Assigned Amount Units (AAUs) ..... 13
1.4.3 Trading of project-generated $CO_2$-credits: JI and CDM projects ..... 14
1.4.4 Baseline Scenario, Additionality and Operational Entity ..... 14
1.5 Market Shares of AAUs, ERUs, CERs; it's all Politics? ..... 16
1.6 Emerging Structure of Commercial Intermediaries ..... 18
1.7 What Carbon Prices are we likely to see? ..... 19
1.7.1 The primary and secondary market ..... 19
1.7.2 Carbon prices ..... 20
1.8 What Qualitative Criteria does the Danish Government use in its Credit Purchases? ..... 23
1.8.1 Price and risk ..... 23
1.8.2 Location of projects ..... 23
1.8.3 Social and development impacts ..... 23
2 PASSIVE INVESTOR IN CERS: FORMS OF INVOLVEMENT ..... 24
3 THE SUPPLY SIDE OF CDM ..... 25
3.1 First-Generation Projects that emerged ..... 25
3.2 Second generation projects ..... 25
3.2.1 CER-revenue intensive projects ..... 25
3.2.2 Marginal projects where CER-revenue turns the balance in favor of commerciality 26
3.2.3 Projects where CER-revenue, without supplementary subsidies, is insufficient to secure commercial viability ..... 27
3.2.4 Use of development aid to assist non-viable CDM-projects ..... 27
3.3 The Role of the Professional Project Developer ..... 29
3.3.1 Annex I investors or project owners from non-Annex I countries? ..... 29
3.3.2 The ESCO-model for project development ..... 30
3.3.3 The royalty-model for project development ..... 31
3.4 What are the Transaction Costs for CDM projects? ..... 32
3.5 Funds to grant-finance Project Development by private Developers ..... 33
3.5.1 Foreign initiatives ..... 33
3.5.2 Danida's CDM office ..... 34
4 CDM-PROJECTS RISKS ..... 35
4.1 Developing Country Investment Risk ..... 35
4.2 Specific CDM-Project Risks ..... 35
4.2.1 Uncertainty over Kyoto Protocol – international political risks ..... 35
4.2.2 CDM-project approval ..... 35
4.2.3 Host Country Environment ..... 36
4.2.4 Uncertainty about estimation and generation of CERs ..... 36
4.2.5 Lessons from the Public Consultation Process ..... 36

4.2.6 Competitors bidding up prices for CERs ..... 37
4.2.7 Risks arising from acquisition of CERs ..... 37
5 PRACTICAL LEGAL ISSUES AND CONSIDERATIONS ..... 38
5.1 Introduction ..... 38
5.2 Relevant Investment Scenarios ..... 38
5.3 Interaction with the CDM regulatory regime ..... 39
5.4 Host Country Environment and Danish Government MOUs ..... 39
5.5 Interaction with the Host Country's Regulatory Regime ..... 40
5.5.1 Environmental Assessment and Public Participation ..... 41
5.5.2 National CDM project cycle ..... 42
5.5.3 National Authorizations and Permissions ..... 42
5.6 Risk Mitigation ..... 42
5.6.1 Developmental investment in a CDM project coupled with a ERPA ..... 43
5.6.2 Miscellaneous issues in regard to contracts ..... 45
5.6.3 Further issues for consideration ..... 45
5.6.4 Miscellaneous recommendations ..... 46

## *Glossary*

| | |
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| AA | Assigned Amount |
| AAU | Assigned Amount Unit (1 ton of $CO_2$-equivalent) |
| Additionality | The requirements that project emission reductions have to be additional to what otherwise would have occurred in the absence of the project |
| Annex I countries | The industrialised countries and economies in transition listed in Annex I of the UNFCCC. Their responsibilities under the Convention include a non-binding commitment to reducing their GHG emissions relative to 1990 levels by the year 2000. |
| Annex B countries | The emissions-capped industrialised countries and economies in transition listed in Annex B of the Kyoto Protocol. |
| Assigned Amount | The amount of GHG emissions that an Annex B country under the Kyoto Protocol may emit in the Commitment Period 2008-2012. |
| Assigned Amount Unit | (AAU) Tradable units of the Assigned Amount of an Annex B country expressed as one metric ton of CO2 equivalent. |
| Baseline scenario | A description of the most likely future development in the considered GHG emitting or sequestrating system without the JI/CDM project |
| Baseline Study | A study including the construction of a baseline scenario, an emission baseline, an assessment of project emissions and a calculation of emission reductions. |
| Carbon Credit | Registered emission reduction benefit arising from a project-level activity. One credit is equal to one ton of CO2 equivalent. |
| Carbon Purchase Agreement | Agreement between buyer and seller of emission reductions in which the conditions of the sale of carbon credits are defined |
| CDCF | The World Bank's Community Development Carbon Fund |
| CDM | Clean Development Mechanism. Mechanism established under Article 12 of the Kyoto Protocol allowing project-level carbon credit transactions between Annex I and non-Annex I countries. |
| CDM M&P | CDM Modalities & Procedures. Decision 17/CP.7. Modalities and procedures for a clean development mechanism as defined in Article 12 of the Kyoto Protocol |

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|---|---|
| CER | Certified Emission Reductions; the terminology for emission reductions generated and approved under the rules of the CDM. |
| Certification | The written confirmation by an OE that during a specific time period a CDM project activity achieved the GHG emission reductions as verified |
| Commitment Period | Period for which the parties included in Annex B of the Kyoto Protocol have agreed that their aggregate GHG emissions do not exceed their assigned amounts, equal to the period 2008-2012. |
| COP/ MOP | Conference of the Parties to the Framework Convention on Climate Change serving as Meeting of the Parties once the Kyoto Protocol has been ratified |
| Crediting Period | The fixed and approved period over which emission reductions units from a JI/CDM project can be generated. |
| Designated Operational Entity | A legal entity accredited by the CDM Executive Board to perform validation, verification and certification functions for CDM projects. |
| EAU | EU allowance unit |
| Emissions Trading (ET) | Trading of Assigned Amounts (AAs) of GHG emissions between the emissions-capped Annex B countries. |
| Executive Board for CDM | Board that supervises the CDM under the authority of COP/MOP, registering projects, issuing CERs, adopting further procedures and approving methodologies for CDM |
| EU-ETS | EU Emission Trading Scheme (Directive) |
| ERU | Emission Reduction Units; the terminology for emission reductions generated under Joint Implementation. |
| ERPA | Emission Reduction Purchasing Agreement |
| GHG | Greenhouse gas; gases, principally carbon dioxide (CO2), which contribute to climate change. The other gases are Methane (CH4), Nitrous Oxide (N2O), Hydrofluorcarbons (HFCs), Perfluorcarbons (PFCs) and Sulphurhexafluoride (SF6) |
| Host country | Country in which the JI or CDM project is implemented |
| JI | Joint Implementation. Mechanism established under Article 6 of the Kyoto Protocol, allowing for the acquisition and transfer of ERUs between two Annex I countries in the period 2008-2012, arising from climate change mitigation projects. |

| | |
|---|---|
| Kyoto Protocol | A Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1997 at the Third Conference of the Parties (COP3) held in Kyoto. |
| Marrakech Accords | Agreement reached under COP7 in Marrakech November 2001 on principles, modalities, rules and guidelines for the so called Kyoto mechanisms. |
| MOU | Memorandum of Understanding |
| NAP | National Allocation Plan |
| Non Annex I countries | Countries with no emission reduction commitments under the Kyoto Protocol. |
| NPV | Net Present Value |
| PDD | Project Design Document, which refers to all the documents to be submitted to the operational Entity to determine CDM project eligibility. |
| Primary carbon market | Purchase of CERs or ERUs directly from the project developer or of EAU directly from a company having a surplus of allowances |
| Registration | Formal acceptance by the Executive Board of a validated project as a CDM project activity. Registration is the prerequisite for verification, certification and issuance of CERs related to that project activity. |
| Secondary carbon market | Onward trading of CERs, ERUs, EAUs or AAUs previously acquired |
| UNFCCC | United Nations Framework Convention on Climate Change |
| Validation | The process of independent evaluation of a project activity by an OE against the requirements of CDM |
| Verification | The periodic independent review and ex post determination by the OE or IE of the monitored GHG emission reductions that have occurred as a result of the JI/CDM project activity during the verification period |

# INTRODUCTION: OBJECTIVE OF THE REPORT

This report gives interested parties in the private sector a short introduction to the concept of the Clean Development Mechanism (CDM), what business opportunities it represents and what the main issues are for CDM-projects. The report is short on details about CDM-procedures, as these can be found in CDM-manuals that are freely available on the internet.[1]

The report's message is that the CDM-project market offers good business opportunities for potential Danish stakeholders:

- For *firms subject to a CO2-quota* under Denmark's National Allocation Plan (NAP) for the EU-$CO_2$ quota directive, signing emission reduction purchase agreements (ERPAs) for future deliveries of "certified emissions reductions (CERs) with owners of CDM-projects, is the least- cost option for covering shortfalls in $CO_2$.[2]
- For *companies looking for opportunities to export technology*, the ability to earn income from sales of CERs expands the market in developing countries for exports of energy efficient equipment and renewable energy technology.
- For *financial traders*, the international market for emissions reductions credits may be lucrative enough to warrant engaging in emissions trading as a general commercial occupation.
- Some niche market opportunities exist for *project developers* and *providers of specialized consulting and financing services*.

The chart on the front page of this report distinguishes six categories of CDM-stakeholders.

On the *CDM-demand side* one finds the Danish companies, who being subject to EU-$CO_2$-quotas and faced with compliance penalties, find the CDM-market a cost-effective means to cover their greenhouse gas reduction targets, and the Danish Government agencies who administer Danish climate policy:

- Private companies subject to $CO_2$-quotas can acquire CERs through active investments in CDM-projects, or as passive purchasers of CERs offered on the primary and secondary carbon markets.
- The Ministry of Foreign Affairs / Danida administers the Government's annual purchases of certified emissions reductions (CERs) from CDM-projects, and helps open the CDM markets to private companies.
- The Danish Energy Authority is responsible for the allocation of $CO_2$-quotas to Danish companies under the National Allocation Plan for EU's Allowance Units (EAUs).
- The Danish Environmental Protection Agency is the Designated National Authority in Denmark, acting also as Chairman of The Government's Climate Committee "Regeringens Klimaudvalg" and acquires emission reduction units (ERUs) from Joint Implementation (JI) projects on behalf of the Danish Government.

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[1] DEA: The Clean Development Mechanism Project Manual, downloadable at www.ens.dk.

[2] An operator, who is allocated an emission allowance, 'retires' the allocation against that operator's actual greenhouse gas emissions over the specified period. An operator who is unable to keep his greenhouse gas emissions within his allocated quota, pays a hefty fine per ton $CO_2$ unless he has purchased an unused $CO_2$-quota from another operator or, alternatively a $CO_2$-credit from a CDM-project, the socalled CER (certified emission reduction).

In *CER/CDM intermediation/facilitation* we find (i) the carbon funds (multilateral funds like the Prototype Carbon Fund, PCF, and private funds) who invest in CERs on behalf of equity owners, (ii) greenhouse gas (GHG)-brokers and (iii) carbon exchanges, who trade in emission allowances.

*Equipment manufacturers, consultants and legal specialists* have an interest in selling their goods and services to CDM-projects.

*Finance, insurance and guarantees for CDM-projects* are provided by private banks, insurance companies and Danida's Mixed Credits. These Danish institutions compete for project funding with financing institutions in the host countries.

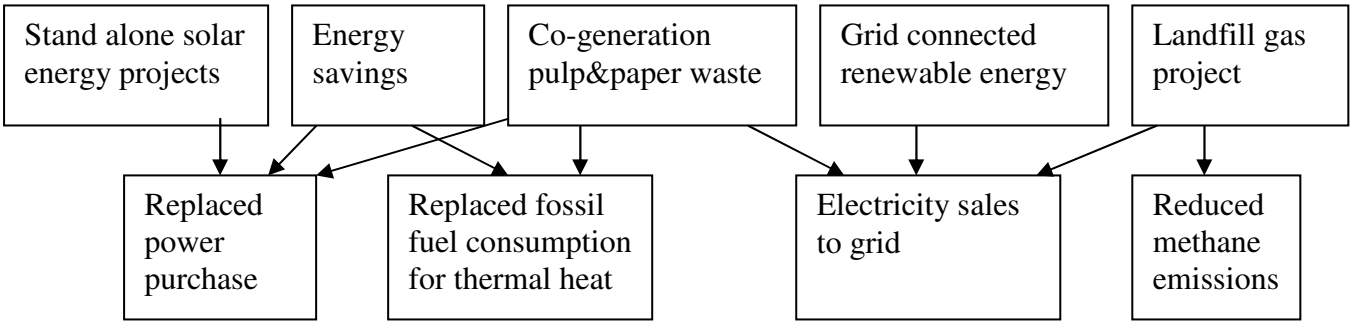
Finally, on the *project supply side* one finds (i) the professional CDM-project developers (from the host country itself and international); (ii) host country firms who perceive an ad-hoc CDM investment opportunity in their business activity, and (iii) the host country government's Designated National Authority (DNA).

The expression "*investing in a CDM-project*", as generally used, covers a wide spread in terms of the depth of financial and of active involvement in a CDM-project. It can mean:

1. Being a "*passive investor*", signing an ERPA with payment either (a) upon delivery, or (b) partially upfront
2. Being a *"active investor*", which can range from (a) signing an ERPA for future delivery and financing the upfront CDM development cost; (b) being equity investor in the CDM-related part of a larger project (or operation), financing all CDM-related project development and capital investment; and (c) being equity investor in a project, which, as a side benefit, generates CER-revenue.

The passive investors in CERs comprise $CO_2$-quota restricted firms, Annex B Governments and financial speculators. Assistance to the financing of the upfront development costs is provided by institutional project sponsors (Danida, as investor on behalf of the Danish Government) and by professional project developers, who also undertake the above 2(b)-type of project. The 2(c)-type of project involves investing in a general economic activity in the host country; which, by using a more expensive but $CO_2$-reducing technology, qualifies for registration as CDM-project. This is the type of CDM-project that interests exporters of energy saving and renewable energy technology.

The range of potential CDM-projects is large, covering an x-number of industries, technologies, and channels for achieving $CO_2$-replacements, ad differing widely in terms of CER-revenue intensity (CER-percentage of operating income). The chart below shows some examples.



Some CDM-projects, in the chart the landfill ga s project, get almost all operating income from their sales of project CERs. For other CDM-projects, the financial value of project-induced savings on their energy purchase bill or from sales of surplus electricity to the grid is much higher than the value of their CER-revenue. In the chart above, an example is the co-generation CDM-project, which gets a reduced bill for power and fossil fuel purchases and income from selling surplus power to the national or regional grid.

The report looks at both the demand side and the supply side of the international CDM-market, trying to assess the main trends on the market as of end-September 2003. Three sub-reports from April 2003 and one from March 2004 provided background information for this report:

- "Analytical assessment of the business situation for CDM-projects and business interests in the Netherlands"; Ecosecurities,
- "Business situation and business interests for CDM-projects in the UK", Campbell Car,
- "Analytical assessment of the supply side of CDM-projects", A.P.H. Dankers and Robert Chronowski (co-editor)
- Chapter 5 on legal issues is an edited version of a sub-report written by IMBEWU Enviro-Legal Specialists (Pty) Ltd., Johannesburg, South Africa in February-March 2004.

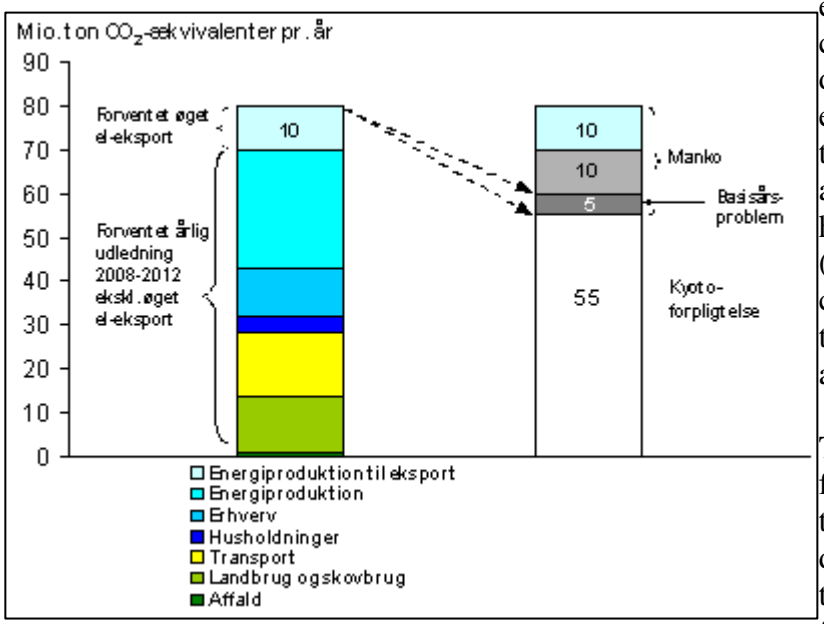
# 1 THE DEMAND SIDE FOR CDM-PROJECTS

## *1.1 What Scope for Credit Purchases is given Danish Climate Strategy?*

The Danish demand for the implementation of CDM-projects is defined by the interaction of EU and Danish climate and energy policy.

By its ratification of the Kyoto-protocol, Denmark is committed to keep $CO_{2e}$ emissions during the first commitment period from 2008-2012, within an average of 55 million tons per year.[3] The Danish Government's climate strategy[4] has a business-as usual scenario of 80 million tons of $CO_{2e}$-emissions during 2008-2012 calling for policy measures capable of closing the 20-25 million[5] tons $CO_{2e}$ emissions gap. This, according to the adopted climate strategy, is to be done through a mixture of "internal" $CO_2$-reduction measures and "external" purchases of "$CO_2$-credits".

As shown in figure 1 taken from the strategy, 10 million tons of $CO_{2e}$-emissions in the scenario stem from expected increased exports of energy (mainly electricity). 25 million are caused by energy production for Danish consumption (power production, district heating, gas supply, extraction of oil and gas). 8 million tons are due to activities in industry and commerce. Emissions from households are a minor contributor (most household emissions are counted in energy supply), while transport and agriculture emit 15 and 10 million tons respectively.[6]




The relative size of the contributions from internal and external measures to cover the 25 million tons gap, depends on their relative costs and the political willingness to pay extra for domestic activities.[7] Payment

[3] A 21% reduction of emissions in the base year 1990.
[4] Grøn markedsøkonomi: mere miljø for pengene, April 2003, "En omkostningseffektiv klimastrategi"
[5] 20 million if the EU, in its allocation of the overall 6% reduction target, accepts to correct the year 1990 baseline for the extraordinary large imports of electricity, 25 million if it does not.
[6] $C0_2$-emissions in 2001 were 54 million tons; 2.3 million from hydrocarbon extraction and refining; 20.4 million from power production, 3.9 million from district heating, 14.5 million from transport, 7.7 million from industry, 4.2 million from households and 0.8 million from commerce and services.
[7] According to the Kyoto Protocol, the "flexible mechanisms" are to be complementary to domestic efforts at CO2-reductions. By implication this means, that at least a part of the domestic effort must be more expensive.

can, to a limited extent come from public subsidies, most will come through preferential power purchase arrangements for grid-connected renewable energy, meaning that the electricity consumer pays.

The strategy fixes the political willingness to pay for internal measures at DKK120 per ton $CO_{2e}$, whereas it expects external $CO_2$- credits to cost less than DKK 100 per ton $CO_{2e}$ with a likely price in the range DKK 40-60 per ton. The cost curve for marginal $CO_{2e}$-reductions in Denmark being very steep, the DKK120 benchmark, according to the Government's strategy, enables *8-9 million tons of the annual reduction target to be achieved by domestic measures*.

The remaining *11-16 million $CO_{2e}$ per year reduction compliance are expected to be secured externally* through purchases of "$CO_2$-credits" (CERs from CDM-projects and ERUs from JI-projects) and "emission allowances" from other companies. Some will be purchased by Danish companies subject to emission quotas, the rest by the Danish Government.

## 1.2 What Scope for Credit Purchases results from the EU's Emissions Trading Directive?

The Danish industry's potential demand for CERs is created by two EU directives:

- The *emissions trading directive (EU-ETS)* gives the government an instrument to create a forced market demand in industry for GHG-reductions in sectors and industrial plants that have a $CO_2$-reduction potential and can pay for its realization without jeopardizing their international competitive position. [8] Companies who expand emissions beyond their assigned allowance incur a penalty of EUR 40 for each excess ton $CO_2$ between 2005-07 and of EUR 100 from 2008 onwards. To avoid the penalty, they can purchase CO2-allowances from firms under the ETS, which have a surplus.
- In addition, the *EU "linking directive"* allows from the year 2005 companies subject to $CO_2$-emission quotas to convert CERs from CDM-projects into $CO_2$-allowances, and ERUs from JI-projects from the year 2008. Acquired CERs are registered and added to the Allocated Allowance of the EU-country hosting the company.

The draft-directive fixes no lid on the percentage of credits which individual companies can use to expand their emission allowance. But it includes a benchmark, as the EU commission will evaluate the need to fix an upper limit "such as 8%" once purchases of credits amount to 6% of the EU-quota.

The EU-ETS directive obliges all member government to prepare a National Allocation Plan, NAP. The Danish NAP for the 2005-2007 period presented by DEA in March 2004, allocates 33.5 million tonnes of $CO_2$ per year to sectors covered by the EU-ETS: 21.7 $MtCO_2$ to electricity and heat, 9.2 $MtCO_2$ to industry and offshore, 1 $MtCO_2$ to new entrants, while 1.7 $MtCO_2$ are auctioned. 337 Danish installations are covered by the scheme; 234 in electricity and heat, and 123 in industry and offshore. The Government's assessment of its impact on an industry's international competitive position is an essential parameter influencing the size of sector-specific quotas. This is why the

[8] The wording in article 8 of DIRECTIVE 2003/87/EC is "Member States should have regard when allocating allowances to the potential for industrial process activities to reduce emissions."

allocation to the power sector is 26 percent below the projected average emissions during 2005-07, while the allocation for other industries is 7 percent below projected emissions and slightly higher than their emissions during 2002 and 2003.

## 1.3 How many Credits will be purchased by Government and Industry respectively?

The Government has set aside 130 million DKK on its year 2003 fiscal budget for purchases of JI-credits and allowances from Eastern European countries. During 2004-07, the Government plans to invest 200 million DKK per year. 100 million DKK are administered by the Environmental Agency, which expects to use 50% of the sum on direct purchases of ERUs from JI-projects and the other 50% on investments in international carbon funds. The other 100 million DKK are used by the Ministry of Foreign Affairs for purchases of CERs; with further funds from the Ministry being used to finance the preparation of CDM-projects. At an indicative average price of €6 per ton, the 930 million DKK(€124 million*) allows the Government to purchase about 21 million tons $CO_{2e}$, or 4.2 million tons per year* for the first socalled "commitment period" from 2008-12.

Table 1 estimates that Danish industry demand during the 2008-12 compliance period for $CO_2$ credits and purchased emission allowances is around 12 Mt$CO_2$/year. This forecast is based on the projected surplus emission of 25 Mt $CO_2$/year of the climate strategy's "business-as-usual" scenario, domestic $CO_2$-reductions of 8-9 Mt and assumed Government purchases of 4.2 Mt.

**Table 1: Breakdown of Danish Kyoto $CO_2$-reduction Obligation by domestic Measures and Carbon Trade**

| **First Compliance Period 2008-12: Average Annual Carbon Objectives** | **Million tons $CO_{2e}$** |
|---|---|
| Forecast average annual Danish CO2-emissions (incl. power exports) | 80 |
| Danish annual AA under the EU's 8% reduction obligation in the Kyoto Protocol | 55 |
| Emissions gap to be filled by domestic measures and carbon purchases | 25 |
| Expected domestic reduction potential at cut-off investment of DKK120/ton | 8-9 |
| Expected compliance through "external" carbon trading | 16-17 |
| Danish Government DKK 930 million investment, acquiring 21 million $CO_{2e}$ | ~ 4.2 |
| Estimated scope of annual carbon acquisitions by Danish private sector | 12 |
| Required annual carbon purchases by Danish power industry for 2008-12 | 10-12 |
| Required annual carbon purchases by Danish non-energy industry for 2008-12 | 0-2 |

*Source: Danish Climate Strategy and estimates by author of the report. The figures are tentative.*

Again using the "business-as-usual" forecasts of the climate strategy for total emissions and the stated expectation that the power sector's emission allowance will be fixed at less than 20 million tons $CO_2$, the power companies would need to purchase about *10 Mt of $CO_2$* credits/allowances per year. This would leave *Danish non-energy industry* with a 0-2 MT/year purchase obligation. The specific demand, obviously, will depend on the "stinginess" of the Danish NAP for 2008-12. Since purchases of CERs are expected to be the least cost option for acquiring emission rights, it would be logical for Danish industry to direct most demand towards purchases of these.

## *1.4 Institutional Framework for CDM*

At first sight, the procedures, extensive documentation requirements and the large number of institutions that are involved in the CDM-project cycle may look complicated. Yet, once the logic behind the CDM-project procedures is understood, the approach turns out to be straightforward.

### 1.4.1 Concession regime for international GHG-emissions

The Kyoto-protocol establishes *a "concession regime" for the regulation of world-wide green-house-gas (GHG) emissions*.[9] Governments of individual states being parties to the agreement are entrusted with all rights to their national emission quota and the responsibility for keeping national emissions within that quota. For the first five-year compliance period from 2008-12 the emissions from Annex I/Annex B countries[10] are capped by a national GHG-quota, called the *Assigned Amount (AA),* which is expressed in terms of tons of $C0_2$-equivalents. The total quota is 5% below the level of Annex I country-emissions in 1990. Some Annex I countries agreed to reductions that are much higher, e.g. Denmark, others are allowed to let emissions increase, e.g. Sweden. The approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfillment of commitments there under commit the Community and its Member States to reducing their aggregate anthropogenic emissions of greenhouse gases listed in Annex A to the Protocol by 8 %. The expectation is that, starting with the next compliance period, the quota system will be extended to include the medium-income developing countries, with the least-developed countries being included later.

To ease Annex I country compliance with their emission targets, the Kyoto-protocol introduces three socalled "*flexible mechanisms*":

(i) trading between countries of assigned allowances,
(ii) joint implementation projects (JI) and
(iii) CDM.

### 1.4.2 Trading of Emission Allowances: the Assigned Amount Units (AAUs)

Annex I countries having a surplus of *"assigned amount units (AAUs)*"[11] can sell these to countries, facing a deficit of emission allowances for their upcoming compliance period, through direct *Government-to-Government sales-purchase agreements*. This, the *Emissions Trading* mechanism, in principle, gives Annex I Governments an economic incentive to implement GHG-saving programs, which go beyond the requirement fixed by their AA. In practice, "surplus states" are "Eastern European" countries, whose economies after the switch to a market economy grew slower than expected with their heavy-energy intensive industries facing particular declines. Their emission surplus is thus a free gift rather than the result of Government policy.

[9] This makes it similar to the concession regime for minerals and for the exploration and production of hydrocarbons, which exists in countries, where underground resources are the property of the State.
[10] See glossary for the very small difference between the two; in the following only the term Annex I will be used.
[11] This, the socalled *Emissions Trading*, is established by Article 17 of the Kyoto Protocol.

### 1.4.3 Trading of project-generated $CO_2$-credits: JI and CDM projects

Governments, through their *Designated National Authority (DNA),* can authorize national companies and private persons to sell "national emission rights", generated by the implementation of specific GHG-reducing projects, to companies or Governments from Annex I countries.[12]

A GHG-reduction project, undertaken between two Annex I countries, is referred to as a *Joint Implementation project*; its tradable $CO_2$-credit is called an *Emission Reduction Unit, ERU*. In principle, any Annex I country can host a JI-project; Danish companies could implement JI-projects in Sweden or Norway. In practice, only Annex I countries with "lax" quotas of AAs, the Central and Eastern European countries, are relevant as host country.

When a *non-Annex I country (=developing country)* is host country for a GHG-reduction project, the project is called a *Clean Development Mechanism (CDM)* project and its GHG-credit a *Certified Emission Reduction, CER*. Since the emissions of non-Annex I-countries are not capped by a quota, it is only through the CDM-project mechanism that developing countries get an economic incentive to make efforts to undertake investments specifically to reduce their GHG-emissions.

### 1.4.4 Baseline Scenario, Additionality and Operational Entity

The key word for earning entitlement to carbon credits is *"additionality",* meaning that a specific effort is made to reduce GHG emissions. The term additional refers to the emissions of the "without-project-situation". The without-project-situation, called the *"baseline scenario*", is supposed to reflect the project activity that would have evolved in a free market, if the CDM-project option – the ability to earn revenue from GHG-reduction efforts - had not existed. The difference between the emissions of a CDM-project and the calculated emissions for the baseline scenario entitles the investor in the CDM-project activity to certified emission reductions, CERs, which can be sold on the international carbon market.

The generation of carbon credits by JI/CDM projects is hypothetical, based on two claims: (i) that an alternative project would have been implemented without the CDM-option ("baseline scenario"); and (ii) that the emissions from the project are lower than the $CO_{2e}$-emissions of the baseline scenario. Since the claims cannot be proven, but only justified, there *is a risk of "moral hazard":*

- The project owner has an obvious interest in inflated CER-calculations.
- The investor signing the emission reduction purchasing agreement (ERPA) for the CERs may share the interest if it means acquiring the CERs at a lower price.
- The host country may also, if it considers the maximization of national income from CER-sales more important than reducing the growth in global warming.

The procedures for approval of CDM-projects and of CERs are, therefore, designed to reduce the risk for manipulation.

[12] Since, the host country Government has the rights in principle to the national emissions its DNA may or may not demand a royalty payment per CER.

First, the baseline scenario and the measured annual emissions from the project require confirmation by a licensed outside institution, a *Designated Operating Entity, DOE*. Before an investor can forward his *Project Design Document, PDD* to the CDM Executive Board for *registration* of his project activity as CDM-project, he must contract a DOE to *validate* that the project fulfills the requirements for registration. The validation of the PDD concerns, in particular, the correct application of an approved baseline methodology. Validation leads subsequently the DOE to request the Board to register the proposed activity as CDM project. The Board places the request for registration and the PDD-documentation on its website, inviting comments. Registration is considered valid after 8 weeks if no request for review was made by a member of the Board.

During the *crediting period*, the project owner contracts another DOE[13] to undertake the periodic *verification* – according to the monitoring plan - of the monitored GHG reductions for *certification* as CERs. The DOE *certifies* the appropriate $CO_{2e}$-reduction and requests the Executive Board to issue Certified Emission Reductions (CERs) accordingly. The issuance will be considered final 15 days after the request is made unless a request of review was made by three members of the Board or by project participants.

PDDs use *approved methodologies to establish the baseline scenario* and the CDM project emissions. The DOE in its validation of the PDD checks that an approved methodology was properly used. When no approved methodology exists for a specific project- type (methane, windenergy, energy savings, etc) the DOE submits the PDD with its draft baseline methodology to the CDM Executive Board for approval. If approved, the baseline methodology becomes a standard that can be used by CDM-project developers, which reduces the cost of PDD-preparation.

The objectivity of a DOE is promoted by it being *accredited by the CDM Executive Board (EB), not by the DNA*. A DOE, which attempts to maximize its involvement in the certification and verification of projects by being lenient is its approval of baselines risks to lose its accreditation.

Additional external quality control during CDM-project preparation and registration is performed by an obligatory *intensive process of public consultation*, where local and international "green" NGOs play the role of external watchdog. The consultation concerns "additionality" and "sustainable development" issues as well as the environmental impact assessment (EIA). It ends when the PDD is put for comments on the website by the Secretariat to the CDM Executive Board before final registration.

The CDM Executive Board (CDM-EB) in its assessment of the first 16 baseline methodologies during July and August 2003 sent the clear message that the additionality-criterion is to be taken very seriously by project developers if they hope to get a project registered as CDM-project.[14]

In its assessment of the first proposed methodologies, the CDM-EB seems to have applied the "*project additionality*" criterion. Generally speaking this means that the PDD must make the case that the CER-revenue stream is essential for project implementation. If the project would come into existence also in the absence of CDM-registration, the project activity itself would represent the baseline scenario.

[13] The DOE contracted during operation for annual CER-verification must be different from the one used for the validation of the project – unless it is a small-scale project.
[14] The EB accepted only two out of 16 submitted methodologies. The rest were outright rejected for lack of additionality or asked to introduce some modifications to their methodology.

The methodologies rejected by the CDM-EB used the "*environmental additionality*" interpretation: showing that the technology results in lower emissions than alternative technology options without proving that the project activity would be different in a free market without CDM.

Some discussion took place about the negative impact of the project additionality criterion on the scope of the market for CDM-projects. But, since the position of the CDM-EB is logical, it is likely to be sustained in the future.

A number of operational policy guidelines can be drawn from the strict additionality policy of the board:

- to get a project registered, be on the conservative side in the modeling of emission reductions from proposed CDM-projects (*lesson for project developers*);

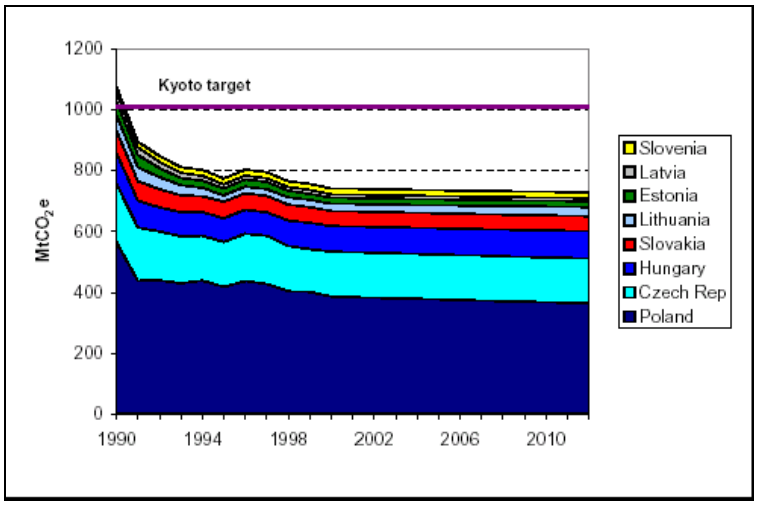
- to maintain that renewable energy CDM-project proposals are "commercially non-viable", *the tariff in purchasing power agreements (PPAs) for grid connected renewable energy systems* must be fixed at a level that makes projects unviable without CER-revenue (guideline for host country policy makers and planners);

- *Government regulations* must not dictate the use of the proposed technology, or define norms, which only the proposed technology in the CDM-project is capable of fulfilling. In that case, the proposed CDM-activity is the baseline scenario.

## *1.5 Market Shares of AAUs, ERUs, CERs; it's all Politics?*

At present it is not possible to forecast the distribution of international carbon trade for the 2008-2012 commitment period between traded carbon allowances (AAUs, emission allowances from companies) and generated carbon credits (ERUs, CERs). The market share of each will be defined by their relative prices, by the risk aversion of investors, by host country ability to develop CDM-projects and by politics: if Governments prefer a balanced portfolio of AAUs, ERUs and CERs.

Due to the huge amount of "surplus" AAUs in formerly communist Annex I countries, Russia and Ukraine in particular, the potential worldwide supply of AAUs, ERUs and CERs outstrips potential demand. EU accession countries, alone, have a surplus of around 300 million tons, see the figure.



Source: UNFCCC database and Point Carbon estimates Point Carbon. September 5, 2003.

Selling Governments have a greater economic interest in promoting sales of AAUs instead of *ERUs from domestic JI-projects*, since the AAU-revenue goes directly into the state budget. The political climate for JI-projects may, therefore, not be overly accommodating. The investment climate for JI-projects is being improved by the signing of Memorandum of Understanding between purchasing Governments- such as Denmark, and "AAU-countries", such as Bulgaria and Romania. These framework agreements state the intention to co-operate in the protection of the global climate as well as the overall responsibilities of the two parties in relation to the development and exchange of JI credits

For purchasing Governments, the price of *AAUs* is the essential determinant for entering that market. AAU purchases do not contribute to GHG-reductions, unless the revenue by mutual buyer-seller agreement is placed in a state fund to support GHG-reduction projects.

To avoid double-counting of $CO_2$-reductions, the EU emissions trading scheme explicitly excludes the possibility to implement JI-projects in companies subject to a quota under the scheme. Since these are the most energy-intensive industries having the largest JI-potential, this limits the scope for investing in JI-projects in accession countries. Yet, methane-projects are still an option.

The *larger and more developed countries* such as Malaysia, Thailand, South Africa, China, India and Brazil, are attracting most commercial investment attention. Due to good national organization, also Chile and Costa Rica got a good start. CDM-projects in the *least developed countries* are the smallest (resulting in high transaction costs per CER) and the most risky (demand for higher rates of return). Political events such as civil wars, can destroy the operation of the CER-generating facility; extra taxes can be imposed on CER-revenue, etc. These risks affect the project owner and the purchaser of CERs. The latter may not be able to get the contracted amount of CERs needed for his compliance period, and be forced to purchase alternative, and most likely, more expensive credits on the international carbon market during the compliance period.

When the flexible mechanisms were conceived, it was believed that the JI and CDM markets would be driven by private demand for and investments in CERs/ERUs. That may be the case for the 2013-17 commitment period. For the 2008-12 period the major demand for carbon-offsets comes from Government purchases. Private demand comes mainly from EU power companies.

In the summary below, one notices the dominance of the Dutch Government in providing an early demand for carbon credits,[15] and that multilateral funds attempt to cater for different political demands. The multilateral funds have different focus areas: early market operations (PCF), thematic (BCF and CDCF), private sector (IFC), and geographic (EBRD and CAF). The PCF targets larger transactions, preferably 200,000 tons and upwards; the CDCF is for smaller projects mainly in the poorer countries, where it tries to include poverty-alleviation aspects.[16]

| As of late 2002, the *major institutional buyers* include: | Capital for investment |
|---|---|
| • The World Bank Prototype Carbon Fund | $180M |
| • Community Development Carbon Fund (CDCF) | $100M (target) |
| • World Bank Bio-Carbon Fund (BCF) | $100M (target) |
| • The Andean Development Bank (CAF) | $40M |
| • The European Development Bank (EBRD) | $61M |
| • IFC-Netherlands Carbon Facility | $40M |
| • Carboncredits.nl, the Dutch ERUPT/CERUPT[17] | $250M |
| • The Netherlands Carbon Development Fund | $175M |

The *multinational carbon funds;* such as the PCF, invest in CDM as well as in JI-projects. The PCF no longer accepts further equity funds, its time has passed. But the World Bank's carbon unit and the EBRD create and operate specific bilateral as well as a multilateral donor funds for investments in CERs and ERUs.

The volume of carbon transactions in 2002 is estimated at US$ 350 million and anticipated to reach US$ 1 billion in 2003[18]. In 2003 other European governments, like Denmark, as well as, possibly, Canada will follow the Dutch model and fund centralized purchase tenders or participate in the above and other new funds operated by international institutions. According to Natsource and Point Carbon, in 2002, the total market size, since 1996, involving private and publicly-funded transactions of carbon credits reached between € 350 million (a conservative estimate, Natsource, October 2002) and € 500 million (a liberal estimate, Natsource, October 2002). [19] The project volumes for 2002 are estimated at 70 Mt CO2 versus year 2001 volume of 12 Mt CO2. See Table 1.

## *1.6 Emerging Structure of Commercial Intermediaries*

A series of *private funds* and initiatives for investment in GHG-reductions are emerging, most of which are preparing for CDM investments. The Spanish Carbon Fund, launched by $CO_2$Spain and $CO_{2e}$.com invests in carbon credits on behalf of Spanish companies. CDC Ixis, a French financial

[15] In October 2003, The Netherlands and the European Bank for Reconstruction and Development have launched a new Carbon Fund. The EBRD will use €32 million of Dutch funds to buy carbon credits from projects for the account of the Netherlands, focusing on energy efficiency projects, such as district heating upgrades, and renewable energy projects.
[16] For more information, please see Annex, "Carbon Funds in an emerging carbon market".
[17] ERUPT for JI projects, CERUPT for CDM projects.
[18] Estimate provided by EcoSecurities Ltd. in the recently (February 2003) prepared UNDP CDM manual entitled 'Facilitating CDM design and implementation – a manual for UNDP country officers'.
[19] As of September 2002, over 125 transactions of GHG emission reductions are known to have occurred involving approximately 335 $MtCO_2e$ (more trades are likely to have gone unreported). Most of these trades have occurred in Annex B countries. Point Carbon, September 2002.

institution is launching a European Carbon Fund contributing €25 million to the initial capitalisation of about €50 million. Other funds are Natsource's Greenhouse Gas-Credit Aggregation Pool (GG-CAP), Econergy's Clean Tech Fund, Fondelec's fund initiative towards Asia, and the Climate Investment Partnership.

*Brokers.* There are small number of brokers who work to stimulate the market, having entered from both green and power sector bases. Examples are Ecosecurities, ICAP, Natsource and $CO2_e$.com, a joint venture of Cantor Fitzgerald and PriceWaterhouseCoopers, Spectron Futures, Tradition Financial Services. The brokers have invested in the market to varying degrees, as is often the case in embryonic commodities. This has extended as far as 'cold-calling' potential trading companies to encourage them to trade.

*Traders*. There are a number of banks and specialist trading houses who will take positions in the market either on their own account, or on behalf of clients. Whilst this sector has not really started there is evidence of development with a number of traders having at least a watching brief, if not already planning their teams. There is, however, some evidence of physical market players (project developers) who are more active in trading joining with financial services organisations to provide funds for CDM/JI projects in return for taking the carbon allowances on to their books for trading.

*Consolidators/Poolers.* Many CDM projects are likely to be very small in terms of the carbon allowances; such that accessing traded commodity-type markets will be difficult for the owners. Consolidation is expected to play a significant role on both the supply and demand sides, as many of the players will not have a trading function as part of their normal business. Through its website, $CO2_e$.com is trying to develop a consolidator function, offering an outlet for very small CDM projects. The target buyers are those seeking socially responsible purchases, since such projects often feature socio-economic benefits that are well beyond the carbon value. The selling price (around €25) is currently several times the $CO_2e$ traded price and it is not clear how much of this premium is the consolidator's fee and how much there is an implicit social valuation of the wider benefits.

*General facilitation services* cover a broad spectrum of consultancy services in (i) engineering, (ii) base lining and preparing projects for emissions trading schemes; (iii) carbon negotiating, (iv) legal, (v) registry and carbon auditing services. They have up so far (September 2003) been the commercially most interesting part of the intermediation business, as the services are needed by all investors.

## *1.7 What Carbon Prices are we likely to see?*

### 1.7.1 The primary and secondary market

The term primary market refers to the *Emission Reduction Purchase Agreements (ERPAs)*, which are concluded between the owner of the CDM-project and a buyer purchasing all or some of the CERs to be generated by the project. They can be concluded through direct negotiations or with the help of a broker.

ERPAs are normally concluded when a project reaches financial closure, that is, before a project starts construction and long before CERs are generated. They are *forward contracts* – of the physical kind – calling for the future delivery of a specified number of CERs during a specified number of years. To ease financial closure, the seller would normally hope for some upfront payment for the future delivery of CERs; the buyer, to minimize his risk, will prefer payment on delivery. If part of the payment for future delivery of CERs is paid upfront, this will be against a discount. The pressure for upfront payment is particularly tense in small countries with weak capital markets, where securing project finance is a problem.

The term *secondary – or derivative – market* for CERs refers to the on-selling of CERs acquired on the primary market to other buyers on a carbon exchange, or through a broker. A large and liquid secondary market is essential for efficient price setting, setting benchmark prices for ERPAs in the primary market. The secondary market, so far, is very small. Buying Governments, the major buyers so far, hang-on to their carbon credits. The remaining demand on the secondary market consists of quota-limited firms who do some trading in CERs and ERUs as a pilot exercise to learn the mechanics of the market, and speculators who invest in carbon credits for future reselling.

### 1.7.2 Carbon prices

Prices for emission allowances, AAUs and ERUs are normally fixed in €/ton $CO_{2e}$, prices for CERs in US$/ton.

*In theory, prices per ton $CO_{2e}$ should be identical except for differences in the risk of non-delivery.* Thus, AAUs and emission allowances should fetch higher prices than carbon credits as their risk of non delivery is zero: once a company has sold some of its emissions allowances, they are assigned to the buyer.[20] In fact, so far, the price premium for AAUs and allowances over ERUs and CERs has been much higher than justified by the lower risk. The price distortion is caused by several factors:

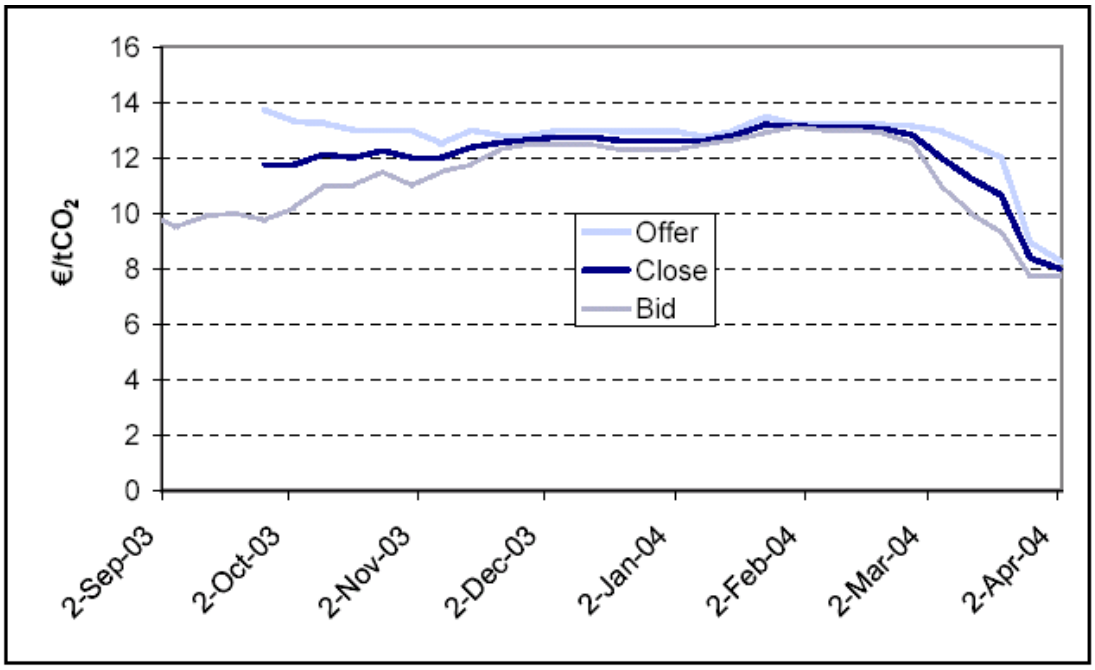
- by the dominance of institutional buyers on the market - each having a specific agenda beyond getting the cheapest possible deal;
- by the absence of a direct connection between CER prices and prices of EU allowance units (EUAs), as the two are not totally interchangeable because of an expected upper limit for CERs/ERUs in the EUA system; and
- by the limited size of the secondary market, which prevents efficient price setting.

In principle, companies can purchase *AAUs* from Governments, in practice, AAU-deals, so far, are concluded between Governments: under the EU quota directive, quota-restricted companies cannot expand their allowances by buying AAUs. The delivery risk of AAUs is zero like that of EAUs. Yet the price per ton is expected to be substantially lower, due to the low "objective" CDM-reduction impact.

Trade in *carbon allowances* (EUAs) takes place between private companies. Traded volume during 2003 and early 2004 for forward deliveries were small, both overall, as well as for the size of individual transactions, where volumes typically were 2,000-10,000 tons delivered in a future year.

[20] If the selling company finds itself short of emissions allowances due to greater than expected production during a given year, it cannot go back on the deal but has to buy the missing allowances on the open market.

Since companies did not know what their allocations were going to be, few were keen to offer their allowances on the market, whereas a number of buyers lined up, offering prices around *€10/ton*. Sellers were typically companies from Central and Eastern Europe (CEECs), buyers are Western European countries. Initially, as one can see in the chart below, initially there was a wide spread between prices of bids (sellers) and offers (buyers), after which prices settled around €12/ton. However, once the first NAPs were published, showing more generous $CO_2$-allocations than some traders had expected, prices dropped to €8-8.5/ton.




The graph above illustrates the price development in the EU 2005 emissions trading market the last 7 months. As there have been few trades with publicly announced prices, the graph is based on reported bids and offers.

**Figur 1: EAU-prices 2003-2004, Source: Carbon Market Europe, April 2, 2004**

*$CO_2$-prices on the UK emissions trading market*, which early 2004 was four to five times larger than traded volumes in EAUs, were in the much lower range of £3.5-4.0/ton. But since it is a UK-specific market, the prices are not directly comparable.

The prices for *ERUs* paid by the Dutch ERUPT program and early experimental private investors were in the range of *€5.5-6.5 per ton*.

*CER*s fetched the lowest prices on the carbon market.[21] PCF paid $3.5-4 per ton $CO_{2e}$[22]; CERUPT US$3.5-5.5 per ton; private purchasers as low as US$2.5 per ton. CDCF will pay up to $6 per ton;

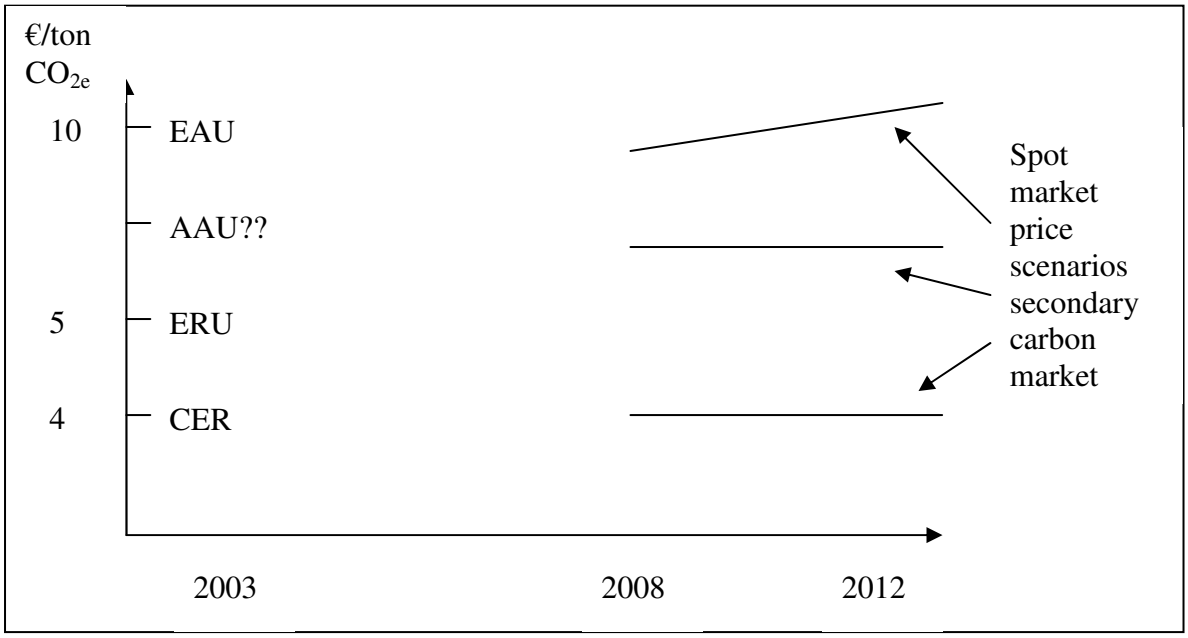
[21] That is, except for prices on voluntary markets. The *Chicago Climate Exchange (CCX)* held an auction on September 30, 2003, using a sealed-bid process for 125,000 metric tons of emission allowances, withheld from the allowance allocation distributed to each CCX Member. The 21 members of the exchange are committed to cutting their greenhouse gas emissions annually by 1 percent, but there is no threat of government prosecution or fines if they fail. 100,000 metric tons were 2003 Vintage and 25,000 metric tons 2005 Vintage. The auction was intended to help members estimate prices and establish trading strategies for trading, scheduled to begin Oct. 31. The prices paid by companies like Ford Motor, DuPont and American Electric Power averaged less than US$1 a metric ton. The low prices - one-tenth the price of over-the-counter trades of EAUs - were propagated as showing the efficiency of voluntary schemes over mandatory schemes like the EU's. In reality, the result raises questions about the effectiveness of a

but that is a good-will price to allow the small projects from the least developed countries get access to carbon-finance.[23]

The CER- (and ERU) deals were made before designated operating entities had been accredited and baseline methodologies been approved, meaning there is a risk of non-certification of contracted CER- (ERU) deliveries. Due to the risks and because they are early action purchases, the prices – at least, the "free market"-prices paid by private companies - should be lower than prices in future ERPAs signed with officially registered CDM-projects. Getting closer to 2008, one would expect CER-prices to increase to somewhere between US$5 and US$8 per ton of $CO_{2e}$.

The inflated price differences for $CO_{2e}$ coming from AAUs, EAUs, ERUs and CERs, respectively, can be blamed on the early pilot-character of the transactions and on the absence of an efficient secondary market providing actors with "market-integrating price signals". The psychological consequence is that actors make use of different benchmarks. On the emissions trading market a price of €10 per ton looks cheap compared with the penalty fee for over-stepping an allowance, fixed at €40 per ton during the initial years and at €100 per ton during later years. On the CDM-project market, a price of US$5 per ton in an ERPA for CERs looks good in the eyes of a seller compared with the maximum price of US$4/ton, which the PCF could offer. The US$4 limit for the PCF, which was reasonable for the initial, high-risk market start-up trial period, has come, instead, to be seen as the "market price" for CERs.

Whatever the reasons are for the high price differences, their existence means that entering the primary market to purchase CERs is good business! As illustrated in the chart below, once we get to the sport market prices during the 2008-2012-period, prices per ton $CO_{2e}$ should become identical for all four carbon-products. Thus, purchasing CERs maximizes profits or minimizes losses.




voluntary market in serving its function of encouraging efficient investment in cutting greenhouse emissions. The price is too low to encourage any investment in $CO_2$-reductions. The CCX has character of show-business.

[22] PCF was by statutes limited to pay a maximum price of US$4 per ton.

[23] Prices lower than US$5-6 do not make CDM commercially viable for small projects due to their high transaction costs per CER.

## *1.8 What Qualitative Criteria does the Danish Government use in its Credit Purchases?*

The system for Danish Government purchases of credits is still evolving, the information below is tentative.

### 1.8.1 Price and risk

The key criterion for the Danish Government's purchases of CERs/ERUs and support to CDM/JI-project development is the *price per ton* $CO_{2e}$ being asked and the quality of the project. Another is the *risk profile* of the CDM-project, which includes a range of aspects and which has a bearing on the price of credits.

### 1.8.2 Location of projects

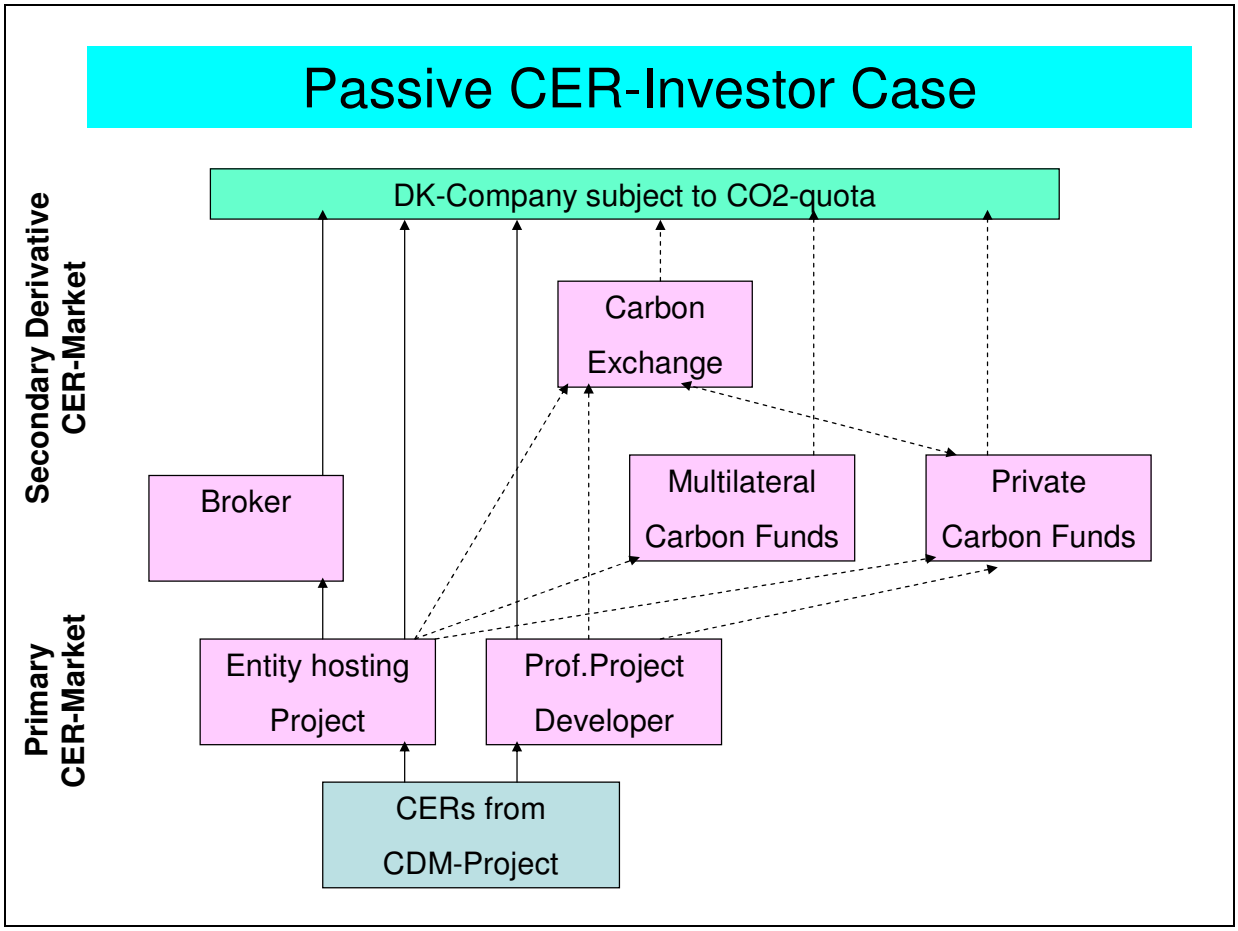
*Malaysia, Thailand, South Africa* have been selected by the Ministry of Foreign Affairs / Danida as main partner countries for Danish Government purchases of CERs. These countries have been chosen because they have fairly large emissions of greenhouse gases and cooperation is already established within environmental assistance including energy. With these countries MoUs will be signed, committing Danida to provide financial support to CDM-related capacity building in the country. The first batches of projects are under preparation and project development facilities will be established in the three countries. Denmark has signed general framework MoUs with Nicaragua, Chile; and a MoU with Indonesia is under consideration.

### 1.8.3 Social and development impacts

Some bilateral donors, such as Canada, in their purchases of CERs from CDM-projects, look also at *social* and *development impact* criteria being willing to pay premium prices for CERs from projects that are strong in these aspects. The need to provide a "protected market" (meaning that investors pay higher prices for CERs) for small-scale projects in the least-developed countries motivated the World Bank to set up the CDCF.

# 2 PASSIVE INVESTOR IN CERS: FORMS OF INVOLVEMENT

Judging from the prices quoted in section 1.6.2, acquiring CERs would seem to be the least-cost option for a Danish company, which expects its emissions to be larger than its emission allowance.




To undertake the purchase, without being active investor in the CDM-project as such, the company has the choice between four different routes of acquisition:

1. To *sign an ERPA for its CERs directly with a project owner* – a host country entity owning the project. Alternatively, the CER-delivery contract could be signed with a professional project developer, who assisted a host country entity in developing and co-financing a CDM- project, in return acquiring ownership rights over some of the CERs.

2. To *purchase CERs from a project making use of a broker*. Brokers typically charge a fee equal to 7% of sales revenue for their services.

3. To *invest in a carbon fund* – one of the multilateral or one of the private funds - which at the end of a year turns over acquired CERs to its investors according to their equity investment.

4. To *purchase CERs on a carbon exchange*.

# 3 THE SUPPLY SIDE OF CDM

## 3.1 First-Generation Projects that emerged

The typical *first generation CDM projects* are *waste management projects, landfill projects, run-of-river hydro projects, wind power projects, biomass based co-generation in industry* and to a much smaller extent, some *solar projects* with the PCF. *Energy efficiency projects* are under-represented to date. PCF has great ambitions to increase the share of energy efficiency projects in its portfolio. PDDs for energy efficiency projects can be difficult to design, but the technique for documenting the results of energy efficiency projects is well-established. ESCOs- energy service companies, have for a couple of decades identified, financed and implemented energy saving projects in OECD-countries against being repaid out of the annual value of registered energy savings.

*Project identification has been mainly top-down*, driven by carbon project sponsors. PCF and UNDP/ UNEP kick-started the market, undertaking active project identification and promotion through contracted professional consultants who visit local municipalities (landfill gas projects) and potentially interesting industries (waste management and biomass based co-generation).

The Dutch CERUPT program used *call for tenders for CER-purchases* to provide an incentive for private companies and professional project developers to develop CDM-project proposals.

Examples exist of *bottom-up project proposals* put forward by NGOs and private sector entities. They are, typically, renewable energy projects, which were in a drawer, not being implemented due to lack of commercial viability, and which were dusted off and re-packaged as a CDM-project. The quality of these proposals is often low.

## 3.2 Second generation projects

With CDM-methodologies and the institutional infrastructure slowly falling into place, project identification and development will become more commercial. With reference to the share of CER-income in total project revenue, it is useful to distinguish between three categories of projects: (i) CER-revenue intensive projects, (ii) projects with modest, but commercially essential CER-revenue content, (iii) projects where CER-revenue without subsidies is insufficient for commercial viability.

### 3.2.1 CER-revenue intensive projects

In projects, where *methane* use, recovery and generation forms part of the activities, and the net present value of future CER-revenue is higher than the initial cost of investment.[24]: Examples are *landfill gas projects*, *industrial-size biogas projects*, c*oal-bed and coal-mine methane recovery projects,; decreased flaring of gaseous fuels* (currently being flared as part of oil exploration

[24] The Global Warming Potential of CH4 (methane) is 23 times higher than that of CO2. This means that the monetary CER-value of reducing 1 tonne of methane equals the reduction of 23 tonnes of CO2. This phenomena is referred to as the methane boost or kick**.**

activities and at refineries of crude oil), and *capture and utilization of fugitive gas projects* (reduced leakage in gas pipelines). The CER-revenue for the reduction of methane emissions is sufficient to make these projects commercially viable, making up the majority of total revenue. Electricity generation - using captured methane in a generator - improves the environmental performance of a landfill gas project compared to flaring of methane. But it does not improve commercial viability; the revenue from selling the electricity output being a fraction of annual CER-revenue.

Landfill gas projects and industrial biogas projects [25] are ideal targets for professional project developers, as they have high rates of return and comparatively low investment requirements. Oil and gas companies would seek to implement reduced flaring and fugitive gas projects; the latter, however, may be commercially viable even without CER-revenues. Coal mining companies, or power plants, located near a mine, would be the logical developers of coal bed projects.

Due to the overwhelming importance of the CER-revenue in operating income, these projects are "100% CDM-projects" in the sense that the revenue from the CERs is sufficient to cover the cost of operations and debt service. The local project owner can either debt-finance the investment using the CER-revenue as collateral, or let a professional project owner undertake project preparation and finance against entitlement to a pre-defined share of future CERs.

### 3.2.2 Marginal projects where CER-revenue turns the balance in favor of commerciality

This category of CDM-projects refers to cases, where CER-revenue does not make up the bulk of operating income / operating savings[26], but where the ability to access CER-revenue, turns marginal investment options into commercially interesting opportunities. This means that the value of annual fuel savings in fossil fuel and electricity consumption and of electricity sales, although higher than annual CER-revenue, would not in itself have convinced the project owner to undertake the investment. Projects in this category comprise:

- *co-generation projects in the sugar and paper industries* (biomass-based fuels are used more efficiently as fuel for generating high pressure steam, partially for process heat and partially for power generation for auto-consumption and sales to the grid); .
- *wood processing factories* (increased use of wood wastes/residues - generating methane during the decomposition process - for the generation of heat for drying and power co-generation)[27]
- *energy savings in energy intensive industries* such as the cement industry;
- *fuel switching* from more carbon-intensive fuels, such as coal and oil, to less carbon-intensive fossils, such as natural gas or various alternative energy sources;

The identification and implementation of these "marginal" projects depends on involvement of specialized "project sniffing" consultants, who have the project packaging skills needed to identify mixes of technologies and finance, which together result in commercial viability.

[25] These comprise ((i) methane collection and utilization from sewage/industrial waste treatment facilities; (ii) animal waste methane recovery and utilization: large-scale piggeries, slaughter houses, food-processing (large dairy farms); and (iii) (chemical) industries dealing with bio-fuels or bio-content slurries as waste.
[26] Except for the fuel switching projects in the list.
[27] A key issue with these type of projects is that the sustainability of the harvesting of the wood resource can be questionable. Assurance of such sustainability is a critical path for the consideration of any wood-based projects.

### 3.2.3 Projects where CER-revenue, without supplementary subsidies, is insufficient to secure commercial viability

If CER-prices are around US$4 per ton, the NPV of future CER-revenue amounts to about 5-9% of the initial cost of investment in grid connected *renewable energy projects* - such as run-of-river hydro projects (up to 25-35 MW) and wind power projects (mostly 20-40 MW, but could be 200-300 MW) - and in *district heating projects*. The small percentage belittles the impact of the CDM-mechanism on expanding the market for renewable energy. Renewable energy lobbyists in host countries use the "ability to attract CER-payments to the national economy" as an argument to increase political support for renewable energy.

In exceptional cases – such as a slightly marginal hydropower plant – CER-revenue turns a non-commercial renewable project into a commercially viable investment opportunity. But in general, CER-revenue represents either *"icing on the cake" for project developers*, or *a means for the state to reduce the cost of national subsidies to renewable energy projects*, which are promoted for reasons of environmental sustainability and local employment generation.

Grid connected renewable energy projects usually have a cost of production per kWh, which is higher than the cost of conventional power generation.[28] The revenue from CERs is insufficient to bridge this commercial cost-revenue gap, making the implementation of renewable energy projects dependent on access to subsidies. These can be investment subsidies or subsidies to kWh-output.

The subsidies to renewable energy systems in developing countries can be financed in three ways:

(i) the electricity consumer pays for the higher cost of renewable energy[29] ;
(ii) the state transfers subsidy funds from the general state budget to investors;
(iii) the state agrees with donors to some of their bilateral grant funds (and mixed credits) allocated to the country, to support investments in renewable energy.[30]

### 3.2.4 Use of development aid to assist non-viable CDM-projects

The Marrakech Agreement states that *public funding of a project is not to result in a diversion of ODA (Official Development Assistance) from Annex-1 parties*. Any funding for CDM is to be additional to- and not substituting for funds flowing from Annex 1 countries to developing countries. When a project is submitted for registration to the CDM-Board, the CDM-Project Design

[28] The exception are hydropower plants with high capacity factors and costs of investment below US$2000 per kW, which compete with diesel generators.

[29] The cost can be imposed on electricity consumers in three ways. (i) A renewable energy fee is levied on national power consumption – via a surcharge on the final invoice to consumers or via a surcharge on transmission of electricity. (ii) The state fixes a guaranteed feed-in-tariff for electricity produced making use of renewable energy systems. (iii) Power suppliers are forced to contract a certain percentage of their power from renewable energy generators.

[30] Once a donor country has allocated a specified ODA-amount to a specific developing country, the promised grant, in principle, becomes part of the future years state budget in the recipient country. The donor and the recipient discuss and decided on the allocation of the amount to specific sectors, and within the specific sectors to specific activities. Donor preferences for or against specific sectors influences the choice of sectors; yet, in the end, the sectors chosen and the activities within are a sovereign decision of the aid recipient. Due to the negotiated process of fund allocation and the fungibility of money – donor funding of one sector allows the Ministry of Finance to shift more of "own country funds" to another sector - it is irrelevant whether subsidies to renewable energy come from national fees and taxes or from donor aid.

Document requests inclusion of "an affirmation that public funding does not result in a diversion of development assistance". The PDD does not state which party is to affirm; thus either the donor country or the host-country can sign that declaration. A host-country Government can certify non-diversion if "country-specific aid funds" are used.[31] But, only the donor country can clarify what the situation is, if "non-country specific funds" are used to co-finance a CDM-project in a specific country. An operational, qualitative check on the fulfillment of the non-diversion criterion can be:

- that there is no conditional link between the authorization of donor aid to a project and the signing of an ERPA for the CERs from the project, beyond the right of first refusal and the repayment of grant-financed development costs if the CERs are sold to a third party;
- that the CER-price in the ERPA is not influenced by the aid-support from the donor;
- that neither the mixed credit nor the CER-revenue alone is sufficient to make the project commercially viable.

The interpretation of the non-diversion clause is, however, still subject to discussion:

- Some experts interpret the non-diversion clause to mean that ODA funds cannot be used to co-finance the cost of investment in a CDM project, except for *CDM capacity building, technology transfer and other activities not directly related to project implementation*.[32]

- Some go a step further allowing *ODA-funds to be used as risk sharing capital in the preparation of CDM-projects*. Aid funds finance the costs of developing the PDD, project verification and CDM-project registration. If the project succeeds in registration, the aid is repaid to the donor or to a local CDM-development fund out of the CER-revenue; if not, the aid is a free gift.[33]

- Others are exploring the possibilities of providing *mixed credits* for CDM-projects.[34] Of the countries, specifically targeted for Danish Government investments in CERs, Malaysia have a GDP per capita which are too high to be eligible for these, South Africa and China still qualify.[35]

OECD's Development Assistance Committee, DAC, will take the political decision on what kind of donor funding of CDM-projects it will accept to register as official development aid (ODA).

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[31] Donor countries program their aid through five-year aid agreements with their partner countries. These agreements provide the finite financial umbrella as well as its distribution by sector. Agreements for the use of Mixed credits are less specific, as the financial umbrella and its distribution by sector is indicative only, its use being driven by project demand.

[32] This interpretation is short of logic. The Kyoto-Protocol does not state that ODA-funds cannot support CDM-projects, only that such funding must not result in a diversion of ODA-funding. Donors have for many years used ODA-funds to support renewable energy projects in developing countries. Continuing a long tradition of soft-credit funding to renewable energy projects does not represent a diversion of ODA-money. Getting CER-revenue for these projects saves an equivalent amount of ODA-funds, which can be used for other development aid purposes. Not making use of the CDM-option to reduce the use of ODA-funds is waste of ODA-funds

[33] Canadian aid has used this procedure, which is also applied by the PCF.

[34] Mixed credits have a grant element of 35% in "middle income" developing countries and of 50% in "low-income" developing countries.

[35] GDP per capita must be less than US$2500 approximately. Also in the case of mixed credits, the agreement between the donor and aid recipient country establishes what sectors and categories of projects have access to mixed credits. Thailand still qualifies, but the Government is not interested in increasing the use of mixed credits

## 3.3 The Role of the Professional Project Developer

### 3.3.1 Annex I investors or project owners from non-Annex I countries?

When the Kyoto-protocol was drafted, *the expectation was that CDM-projects to a large extent would be implemented by Annex I investors* (cases 4 and 5 above), transferring, in addition to CER-payments, also *new technology* to non-Annex I countries.

The second objective is being achieved, as illustrated by the landfill gas projects. They have been implemented in Annex I countries for a couple of decades for "environmentally-friendly energy reasons", but would not have a market in non-Annex I countries without the CDM-mechanism.

The transfer of technology, however, is not dependent on the involvement of non-Annex I investors as direct project owners in CDM-projects. When local expertise is not available, the host country project owner can take recourse to international consultants to identify the relevant and most cost-effective technologies. *The prevailing trend is that CDM-projects are carried out by host country project owners* with an Annex I party signing an ERPA for the CERs with the local project owner. The trend has been helped by the dominant role of the institutional project sponsors (PCF/UNDP, bilateral programs) in the identification of CDM-projects.

The approach used by PCF (and also UNDP/UNEP) is to *contract international experts to visit potentially relevant industries and municipalities "sniffing up" CDM-project opportunities* for the institutional project sponsor to invest in.[36] The consultant then, under contract with PCF/ UNDP/ UNEP, designs the PDD if a promising CDM-project is identified. The Danish Government/Danida has so far applied the "hired project sniffing consultants-approach" in its CER-purchase strategy. In Thailand, Malaysia and RSA, Danida- contracted consultants prepare CDM-projects with which the Danish Government signs an ERPA; but Project Development Facilities will be established in these countries to attract project ideas. The institutional investors increasingly require hired international consultants to work with host country consultants transferring their know-how, thereby building up local, cost-effective, expertise, which a local project host can rely to assist in him into developing a CDM-project idea into a CDM-project.

Other Annex I Governments use the *"CDM project tender approach"* to identify CDM-projects, most important, the Dutch Government's ERUPT and CERUPT programs. Due to short lead times, this approach also favors project proposals owned by host country investors over projects prepared by international project owners, but it allows more scope for the latter than the "hired project sniffer approach". Yet, a more important difference is that the tender approach favors the creation of a class of professional project developers, who actively scout the international market trying to identify promising investment opportunities in cooperation with a local project owner, either

[36] The institutional investors will continue to play an important role on the market during the next few years. Yet, as the name "Prototype Carbon Fund (PCF)" indicates, they are created as temporary solutions, to end their life once the private market is capable of taken on their business – the PCF already no longer accepts further equity funds. As soon as the institutional funds no longer acquire CERs and ERUs cheaper than competing private carbon funds, Government and private equity investors in the PCF get an economic incentive to shift future investments into other funds. That will turn CDM-project development into a purely commercial activity. The exception are least developed countries, whose projects are too small to compete internationally without favorable treatment from donors and development banks.

entering in a joint venture with the project developer, or providing their project development services against a royalty fee.

The two approaches are complementary in developing expertise required for the development of CDM-projects in host countries: a local potential project host can contract a consultant to assist in developing a project idea into a CDM-project, or liaise with a professional project developer to let him undertake the specialist task.

Liaising with a professional project developer reduces the investment, which the project host needs to finance upfront. Whereas a consultant is paid before CER-revenue starts rolling in, the project developer finances the transaction costs up to the point of registration, being repaid out of the CER-revenue stream. The project developer may also assist in co-financing the physical investment and in selling CERs on the market at premium prices.

The project developer option will win if a potential project host can be persuaded that the NPV of the cost of the services of the project developer (net of any financing benefits, the project developer may provide) is lower than the NPV of the transaction costs using the consultant route.

### 3.3.2 The ESCO-model for project development

A key obstacle to investments in industrial energy projects is that the cost of energy in percent of the total cost of production is insignificant in most industries, except for energy-intensive industries, such as aluminum, glass production, cement. For this reason, management spends little time on identifying feasible energy saving investments and developing in-house energy saving expertise. The in-company attention and know-how void creates a market for ESCOs (Energy Service Companies, which are energy saving specialists, who offer companies (and housing associations) to take over responsibility for identifying, designing, financing and implementing a cost-effective energy-saving investment program for the entity. The ESCO is repaid out of the financial value of registered energy savings. Typically, there is an 80%/20% split between the ESCO and the project host until the investment is amortized.

A number of conditions must be fulfilled if establishing an ESCO is to be commercially viable:

- The ESCO must have highly specialized and superior know-how – keeping down its cost of project development and of physical investments - and have access to first class project financing terms.[37]
- Due to the large fixed costs of transaction in project identification and preparation potential individual clients on the market must have a large energy demand (costing more than US$100,000 per year).
- Due to the large fixed costs of establishing and marketing an ESCO-company, the market for ESCO-services must be large enough, meaning that there must be a sufficient number of large potential clients.

[37] Presently, due subsidy schemes by Annex I-countries for project development, an additional success factor is ability of the ESCO to attract grant money for project development.

The risk of local currency devaluation is not a major market risk for ESCOs. Prices of CERs and of saved internationally traded fuels, are fixed in US$, so if there is a local devaluation, the nominal revenue goes up. The exception may be electricity tariffs, as these often are subject to rather arbitrary price regulation. Otherwise there is only a risk of non-convertibility of the annual funds for the energy saving part (not the CERs, which are paid in dollars).

ESCOs operate already in larger developing countries such as Thailand, Malaysia and Vietnam. The CDM-mechanism increases the commercial market for ESCOs.

### 3.3.3 The royalty-model for project development

The royalty model, which is being introduced in landfill gas projects[38], is a close relative of the ESCO-model.

The municipal or private companies, which own and operate landfills, are not experts in landfill gas extraction and electricity operation, nor in CDM-project preparation. Often, they may also not be particularly creditworthy.

The project developer offers to take on project development, financing and operation of a landfill gas project using the premises of the landfill. The landfill owner and operator is offered the choice between:

(i) receiving an annual royalty payment from the project developer in return for his right to own and operate the CDM-project;
(ii) joint-venture ownership of the CDM-operation, with CERs being split according to an agreed formula, and where the developer assists in finding a buyer for the CERs at internationally high prices;
(iii) the "ESCO option" of temporary ownership by the project developer until his investment has been recuperated.

The structure works works as follows.[39]

The project developer is responsible for: (i) identifying the most appropriate option for extraction and use of the gas; (ii) arranging all financial, legal and technical aspects of investment in the landfill gas project; (iii) development of all CDM related transactions, including all PDD documentation (baseline study, monitoring plan, etc.), contracting an Operational Entity for validation of the CDM documentation; organisation of a local stakeholder consultation event; marketing of carbon credits to various buyers; negotiating an Emission Reduction Purchase Agreement (ERPA) for sale of the carbon credits to a buyer; (iv) construction and operation of an appropriate landfill gas collection system, which often leads to an improvement in the site management; (v) construction and operation of a project to utilise the landfill gas (e.g., electricity generation, energy use, transportation, etc.);

[38] EcoSecurities has entered into an alliance with Standard Bank to identify and finance projects which will generate emission reductions, concentrating above all on landfill projects.
[39] The approach describes is adopted by EcoSecurities.

The landfill owner would be responsible for all tasks, where he has the comparative advantage: (i) the management of waste deposited at the site, for example, collection, compaction, closing cells, etc; (ii) liaising with the local municipality and obtaining all required permits; (iii) conducting an Environmental Impact Assessment (EIA); (iv) dealing with any environmental requirements related to the management of the landfill.

In exchange for the rights for the extraction and use of the landfill gas, the landfill owner would be remunerated through royalty payments based on the revenue streams generated by the project.

The risk of the CDM-project is low, enabling the project developer to get finance at the best terms available: landfill gas technology is well-known; the potential value of carbon credits far exceeds the investment required to generate them; the physical investment is undertaken first when an ERPA has been signed; the ERPA can dictate that payments are made directly from the buyer to the lending bank, reducing country or currency risk.

## 3.4 What are the Transaction Costs for CDM projects?

Transaction costs are defined as costs incurred in order to complete a transaction. Transaction costs are all costs associated with the design of a CDM project and the transfer of CERs. Transaction costs are incurred at different times during the project cycle:

- *prior to PDD- preparation*, there are costs for pre-feasibility studies, initial discussions with potential partners and financing institutions, communicating with government;
- costs for *PDD-preparation, validation and CDM-project registration, legal fees;*
- *during operation,* costs are incurred for CER-verification and certification, the CDM Board retains a 2% levy of CDM project proceeds for use as an adaptation fund[40] plus a fee to cover the administrative expenses of the CDM-Board and its secretariat.

In addition, there may be other costs such as payments for insurance services to ensure delivery of contracted CERs. There may be a Host Nation requirement to share CERs (several nations may levy this in the form of a tax – Chile for example may levy the sharing level at the rate of its domestic VAT).

High transaction costs discourage project sponsors/developers and can make a project unfeasible. The value of the CER's on the project must be markedly more than costs associated with undergoing the transaction. Transaction costs therefore particularly threaten project viability when the volume of CER's on offer is relatively low or when the price offered for reductions in very low. Transaction costs that make a project unviable at a market clearing price of US$3.50 per ton $CO_{2e}$, may be acceptable at a price of $7.00 per ton. Table 1 below presents an example of a carbon transaction consultant's cost for preparing a CDM project and is a realistic estimate based on experience in the field.

Transaction costs will evolve toward standardized fees. CDM experience will result in replicable templates for all stages of project documentation and contracting accompanied by a fall (and better predictability) in CDM transaction costs as the fill in the blanks templates are widely adopted.

[40] CDM-projects in least developed countries, LDCs; are exempt from this adaptation levy.

Transaction costs for a successful CDM project can be subdivided into the cost components as listed in Table 2.

*Table 2: Transaction cost estimates*[1)]

| CDM Project Cycle | Carbon Transaction Consultant's Estimate of Cost (EURO) |
|---|---|
| A) **Up-front (pre-operational) Costs** | |
| 1. ER Feasibility Assessment | 5,000 – 20,000 |
| 2. Preparation of the PDD[2)] | 25,000 – 40,000 |
| 3. Registration | 10,000 |
| 4. Validation[2)] | 10,000 -15,000 |
| 5. Legal Work | 20,000 – 25,000 |
| Total Up-front Costs: | 70,000 – 110,000 |
| B) **Operational Phase Costs**: | |
| 1. Sale of CERs | Success fee in region of 5 -10% of CER value. Higher for a small project than a large project. |
| 2. Risk Mitigation[3)] | 1-3% of CER value yearly. Mitigation against loss incremental ER value as a consequence of project r |
| 3. Monitoring and Verification[4)] | 3,000 – 15,000 per year |

(1) Source: EcoSecurities; (2) In the Dutch CERUPT tender €25,000 is paid for preparing the PDD of a CDM project, and €12,500 for the validation. (3) Risk Mitigation Fees: the potential fee a developer may wish to incur so as to insure against non-delivery of contracted CERs. This could take the form of a specific Insurance product, which are only now emerging. (4) Higher costs are incurred if on site verification is mandated, vs. remote verification.

## *3.5 Funds to grant-finance Project Development by private Developers*

### 3.5.1 Foreign initiatives

The U.K.'s *Climate Change Project Office (CCPO*) is a collaborative organisation sponsored by the two principal government departments responsible for climate change issues, the Department for Environment, Food and Rural Affairs (DEFRA) and the Department of Trade and Industry (DTI). The CCPO is the point of contact for the UK National Authority (DEFRA). It is a small office, with 5 staff members, and has secondees to supplement its expertise in the development of JI and CDM projects Formed in October 2001, its remit is to advise and assist UK business to participate in JI and CDM projects in any role, even if the UK is neither host nor sponsor.

The U.K.'s *Foreign and Commonwealth Office (FCO)* administers the Climate Change Challenge Fund along with DEFRA. Its aim is to assist CDM projects for foreign hosts.

### 3.5.2 Danida's CDM office

By 1 September 2003 Ministry of Foreign Affairs established a CDM-unit in its Asia-department. The unit is responsible for coordination of CDM activities including strategic and policy issues; opening of markets and purchase of CO2-credits from developing countries. CDM project preparatory activities are already well under way in Malaysia, South Africa and Thailand managed by staff at the Danish embassies in these countries.

Danida has so far financed project development directly in Thailand, RSA and Malaysia managing the project identification process directly through the local Danida representation. Project Development Facilities will be established in these three countries to identify and develop CDM projects.

# 4 CDM-PROJECTS RISKS

## *4.1 Developing Country Investment Risk*

Active CDM investment in Non-Annex I countries is analogous to other foreign direct investment in developing countries, and companies familiar with such investments will be *au fait* with the relevant risk-considerations. Some of these risk-considerations include the spectre of currency fluctuation, unstable political structures and lack of technological and other expertise. This means that investment in a CDM project must be approached with as much, if not more, caution and information-gathering as any developing country investment.[41]

## *4.2 Specific CDM-Project Risks*

### 4.2.1 Uncertainty over Kyoto Protocol – international political risks

The many uncertainties within the international legal framework governing emissions reductions - international political risk - include whether the Kyoto Protocol will become operational, and whether or not this will affect prospects for generation and trading of credits, or transfer of credits between trading schemes. [42]

### 4.2.2 CDM-project approval

*Receiving Host country approval* (which requires compliance with a number of authorization requirements, including EIA requirements), and *registration with the Executive Board* (which requires uncontested validation of the project by a DOE), can be a lengthy and uncertain process. The prospect of not receiving these approvals is a risk in undertaking the CDM investment.

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[41] Some other general investment issues that usually need to be considered include: (i) taxation on foreign investment; (ii) local expertise and statutory requirements for use thereof; (iii) the local insurance industry (in a CDM context it will be important to know whether the local insurance industry is sophisticated enough to deal with CDM risk issues or whether specialist international insurers are required); (iv) local infrastructure; (v) policy and legal positions on land ownership (this will be important for the CDM investor in Non-Annex I countries where land ownership may be the subject of some dispute, perhaps as a result of historical inequities - Zimbabwe, for example, or certain areas of South Africa); (vi) labour law requirements; (vii) company law will be important if a new legal entity is required in the developing country to take responsibility for the foreign investment; (viii) integration between levels of government and predictability of administrative legal decisions, (ix) authorisations required to conduct activities related to the investment.

[42] For divergent views on this last point see: *IETA Position on the Commission Proposal to Link Kyoto JI and CDM Project Credits to the EU Greenhouse Gas Emissions Trading Scheme (ETS)*, www.ieta.org , and *Seven Reasons To Reject The Linking Directive*, www.greenpeace.org .

### 4.2.3 Host Country Environment

The key hurdles to accelerated CDM project implementation continue to be the non-understanding of baselines by potential project sponsors and host governments, the energy pricing limitations in many countries (for example South Africa, Brazil, and China), and the inability to get the National Designated Authority in many countries into an informed pro-active project preparation mode. While many excellent tools for understanding t he CDM process have been developed by the bilateral and multilateral sources, such tools do not seem to be in use where they are specifically needed. There is an apparent mismatch among resources available, awareness of resources available, and ability or motive to access and utilize such resources.

*Currency fluctuation*: Certain payments pertaining to project initiation will probably have to occur in a potentially unstable currency, fluctuations in which might adversely affect the cost-benefit ratio. Other components affected might include prices of CERs, capital and importation costs of capital equipment.

### 4.2.4 Uncertainty about estimation and generation of CERs

*During feasibility assessment and project design*, the consultants employed to perform these tasks may be negligent and/or provide incorrect advice on, for example, the quantity of CERs that can be generated, or in calculating the baseline and additionality scenarios.

*During operation*, there is uncertainty about the de facto generation of CERs, i.e., the quantities of emissions reductions. For example, fire may destroy the trees in a forestry project, or technical problems might inhibit the operation of a renewable energy project. Both scenarios may lead to the generation of fewer CERS than anticipated. Delays in certification and issuance can lead to non-compliance with emissions reduction allocations by the end of a crediting period.

### 4.2.5 Lessons from the Public Consultation Process

Before the PDD-documentation is forwarded for CDM-project registration, a public consultation process must have taken place.

Local opposition to e.g. landfill projects can be reduced by allocating part of the CER-revenue to a fund financing social and development projects for the local community living in the area where the CDM-project is located.

Serious doubt exists among the international NGO community - who are closely following the CDM developments world wide - whether first generation projects are really additional (mainly financial additionality) and that many of them would have developed anyway. Via the internet international and local NGOs are in close contact about project developments. Opposition to projects of doubtful value is strong. Unfortunately, also some mis-information has been seen about good-value projects.

### 4.2.6 Competitors bidding up prices for CERs

The fear of losing money – being cheated in a deal – is probably as strong as the desire to make a profit. Because the carbon market in general and the CER-market in particular, is in an early phase, and because of the difference between CER and EAU-prices, the price negotiations for an ERPA can be quite difficult.

In addition, "noise signals" from self-proclaimed carbon-dealers may disturb the climate for negotiations. During ongoing negotiations for a PCF-purchase deal in South Africa, for example, the municipality hosting the project received 50-60 "offers" from persons claiming to be interested in buying or brokering the CERs from the project. It took some explanation to convince local politicians that there is a difference between an "offer" from an un-capitalized self-proclaimed broker and an offer from a well-capitalized buyer like the PCF.

### 4.2.7 Risks arising from acquisition of CERs

The CER-buyer (the investor) is reliant upon the CER-seller (the CDM project proponent) to deliver the product (CERs) according to the terms of their purchase agreement (the ERPA). From the *perspective of the CER-buyer* the following possible risks emerge from this dependence:

- *Failure to deliver CERs*, e.g., because the spot price of CERs, at the time of delivery, has risen above the predetermined ERPA pricing, and the CER-seller tries to make more money by selling CERs on the spot market rather than delivering in terms of the ERPA.

- *Insufficient or late delivery of CERs*, which may expose the CER-buyer to liability for non-compliance with its emissions reductions commitments.

From *the CER-seller's perspective* there is the possible risk that the spot price for CERs is below the predetermined ERPA pricing and the buyer repudiates the agreement in favour of purchasing on the spot market.

# 5 PRACTICAL LEGAL ISSUES AND CONSIDERATIONS

## 5.1 Introduction [43]

The intention of this chapter is to give the potential Danish industry CDM investor, an insight into some of the legal issues that may impact CDM-investments. [44] The chapter is not a definitive or comprehensive statement on CDM legal issues. It should be regarded as an introduction to certain important legal questions that require further investigation. Such investigation would occur *inter alia* in the context of:

- the type of CDM investment contemplated,
- the identity of the investor,
- the project activity decided upon (whether, for example, the project is a renewable energy project or one that utilizes landfill gas),
- the CER and investment requirements of the investor relative to the amount of investment capital and other investment choices available, and
- the geographical location of the CDM project.

## 5.2 Relevant Investment Scenarios

For the discussion of generic legal issues that may emerge if the investor's choice is to acquire CERs, in particular the following two investment scenarios are considered: [45]

- **Active investment** in a CDM project in a Non-Annex I country (the Host country) coupled with an agreement to purchase CERs from the CDM project proponent in terms of a Certified Emission Reduction Purchase Agreement (ERPA).[46]
- **Passive purchase** of CERs in the primary market, i.e., purchase of CERs from a CDM project proponent by way of ERPA. [47]

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[43] Chapter drafted by IMBEWU Enviro-Legal Specialists (Pty) Ltd., Johannesburg, South Africa, www.imbewu.co.za

[44] This chapter is written from the perspective of practical experience gained in assisting with the environmental legal aspects of developing CDM projects for Danida and PCF in South Africa. At the time of writing, the Danida portfolio of CDM projects in South Africa consists mainly of the Type 2(a) CDM projects, as described in the section entitled *Introduction: Objective of this Report*. Such CDM projects are extremely useful "learning-by-doing" exercises because, at least arguably, they represent a hybrid between active and passive CDM investments as described above.

[45] See the introduction to this Report for a fuller discussion of the term "investing in CDM".

[46] The term "project proponent" as used in this Chapter is analogous to the use of "project owner" at Section 3.2 above. A further possible 'active' scenario occurs where the investor is a multi-national company, with a branch in a Non-Annex I country. The possibility here is that the Non-Annex I branch of the multi-national investor could initiate a CDM project which generates CERs. In this instance, and depending on the nature of the relationship between the multi-national investor and its Non-Annex I branch, the multi-national investor would be able to set-off the CERs generated by its Non-Annex I branch against its emissions reductions commitments in terms of the Danish NAP. Note that the international regime governing the CDM and generation of CERs would still be applicable, as would the national legal regime of the Non-Annex I country.

[47] Such CERs may have been generated *inter alia* by the CDM project proponent in conjunction with another Annex I investor, or by way of unilateral CDM project.

Both investment scenarios may require that the investor interact with some combination of: the Host country, the Host country's domestic legal regime, the CDM project proponent and/or the international CDM regulatory regime.

This differs from purchase of CERs on the secondary market, which would bring the investor into contact with brokers or commodities traders. While it may be more convenient simply to purchase CERs in this manner, such CERs are likely to come at a premium (see Chapter 2).

Four possible aspects of the above mentioned active and passive CDM investment scenarios are considered below, namely (A) interaction with the CDM regulatory regime, (B) interaction with the Host country, (C) interaction with the Host country's regulatory regime, (D) risk mitigation and contracts.

## 5.3 Interaction with the CDM regulatory regime

As indicated at Section 1.3, there is a well-elaborated project cycle for the implementation of CDM projects. Executive Board amendments to the CDM project cycle are posted on the official CDM website, at: http://cdm.unfccc.int . This website is an essential reference for potential CDM investors and *inter alia* provides explanations of the CDM *Modalities and Procedures* (CDM-M&P), and suggestions for their practical implementation.

Practical issues that may arise for the consideration of investors within the CDM project cycle include:

- The need for professional independence of the DOEs required for validation of the CDM project and verification and certification of CERs generated, and the consideration that a DOE is under contract to the project participants. [48]
- The possibility of submitting a written request to use the same DOE both to validate and then to verify and certify. [49]
- The minimum requirements of public participation and environmental assessment. For convenience these issues have been more fully considered under Aspect C, below.
- The technical requirements relating to additionality and baselines. (See Section 1.3.4).
- The difference in procedure that is required for approval of a new baseline and monitoring methodology. [50]

## 5.4 Host Country Environment and Danish Government MOUs

CDM has some specific issues peculiar to itself. The question of who owns the CERs is one such issue, and relates to the fact that CERs are created in terms of an international treaty agreed between sovereign states. An argument can therefore be made that CERs are owned by the state and not the particular CDM project proponent. This poses the further question of whether the project proponent

[48] CDM-M&P, Sections D and E, and paragraph 37.
[49] CDM-M&P, paragraph 27(e).
[50] CDM-M&P, paragraph 38, and see under: "General issues for consideration", below.

is entitled to sell CERs without first obtaining the state's permission to do so, or taking a cession of the state's ownership rights. It is most likely that this issue is resolved by the individual Host country, but it is important for the CDM investor to be aware of the status of CERs in order to conclude a valid ERPA.[51]

The Danish government's conclusion (or impending conclusion) of non-binding, CDM-related MoUs with Malaysia, Thailand, South Africa, China, Indonesia, Nicaragua and Chile should, depending on the content of the various agreements, mitigate certain risks posed to investors because the MoUs are intended to facilitate Danish public and private-sector CDM investment. For example, the Nicaraguan MoU provides that Danish companies can purchase CERs originating from any project in Nicaragua. [52] It indicates that, in the event of changes in national policies that hinder CDM project development and CER transfer, both countries will do their utmost to ensure practical transfer of CERs. The intention of this provision is to deal with problems of political uncertainty.

The CDM-Modalities & Procedures (M&P) *inter alia* require that the Host country comply with certain minimum requirements for participation in the CDM and generation of fungible CERs, [53] namely that it be a Party to both the UNFCCC and Kyoto, and that it have a DNA. It seems reasonable to assume that the countries with which Denmark has concluded MoUs have either complied with these requirements, or are in the process of doing so, but it is always a good idea to check this issue. The MoUs generally provide that the national CDM offices will assist Danish CDM investors with information and advice. Consequently it is strongly recommended that potential investors approach Host countries' DNAs for country-specific information. The corollary to this is that, for clarity's sake, investors should consider confining their investments to Host countries that have operational DNA's. [54]

## 5.5 Interaction with the Host Country's Regulatory Regime

These interactions may flow from the requirements of the CDM-M&P, and from the Host country's generic regulatory requirements (permissions and authorizations) pertaining to foreign investment and to the initiation and operation of particular CDM project activities.

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[51] This is because the project proponent must have legal title to the CERs in order to be able to transfer this title to the investor.

[52] The Dutch ERUPT Tender Terms of Reference (which pertain *inter alia* to ERUs from JI projects), deal specifically with CER ownership. Paragraph 2(e) of Appendix 10: "General Terms and Conditions Pertaining to the Contract", provides that a Contractor wishing to enter into an agreement with Holland for the sale of ERUs "…warrants and undertakes that it will have all rights and title to all Emissions Reductions including all ERUs, AAUs and EUAs arising from the Project". (www.carboncredits.nl ). This issue has also arisen in New Zealand where carbon sink (forest) owners have accused the New Zealand government of expropriating their private property rights by deciding to retain for its own programmes earnings from sales of emissions reductions generated by New Zealand sinks. (www.pointcarbon.com)

[53] "Fungibility refers to the possibility that one unit/product, or a unit of a currency, can be exchanged for, or replaced by another. The (climate change-related) negotiations on fungibility relate to whether emissions units are freely exchangeable, i.e., whether an ERU is exactly equivalent to an AAU/PAA or CER". (Inter-national Petroleum, Industry Environmental Conservation Association, *Climate Change: A Glossary of Terms,* Third Edition, January 2001, page 20).

[54] See: *CDM Monitor,* 6 August 2003, "Regional Survey – South America", www.pointcarbon.com for a brief investigation of the status of South American DNAs and a relative evaluation of CDM investment risk.

### 5.5.1 Environmental Assessment and Public Participation

The CDM-M&P require that comments by local stakeholders [55] on the proposed CDM project activity must be invited and that a summary of comments received, and how these have been taken due account of, must be reported upon. [56] In addition, documentation on the analysis of the environmental impacts of the project activity must be submitted. Consequently public participation and environmental assessment are among the minimum obligations for the implementation of CDM projects. (See Section 1.3, above, for reference to other minimums). These public participation and environmental assessment minimum obligations do not necessarily require interaction with the Host country's regulatory regime. However, if the "project participants" [57] or the Host country regard the environmental impacts of the proposed CDM project to be significant, then an environmental impact assessment (EIA) must be undertaken according to the requirements of the Host. [58]

The detail required for environmental assessment is not specified in the CDM-M&P and the DOE, in reviewing the PDD, will be responsible for deciding whether this requirement has been sufficiently complied with. On the other hand, if an EIA is to be performed then the CDM project activity will be subjected to the degree of rigor required for EIA in the Host country. The purpose of EIA is usually to provide an administrative decision-maker with information to inform the decision of whether to permit or prohibit a proposed activity. A positive outcome will thus usually determine whether the proposed CDM project activity may, or may not, be undertaken. Consequently if an EIA is required then the proposed CDM project will have to comply with the Host's national regulatory requirements for EIA before it can be implemented. This means that the determined CDM investor will either have to comply with this requirement (usually via specialist local consultants), or seek to place the onus for such compliance on the CDM project proponent. Conducting an EIA can be very costly and incurring such cost will obviously affect the level of capital investment required to initiate the CDM project.

The CDM-M&P also require that the DOE *inter alia* receive, from the project participants, written confirmation by the DNA of the Host country that the project activity assists it in achieving sustainable development.[59] It is left up to each Non-Annex I country to determine the meaning of "sustainable development" in its national context.

Advantages of performing EIAs include:

- They usually require detailed public participation processes, which may facilitate compliance with the public participation requirements of the CDM-M&P.

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[55] "Stakeholders" means the public, including individuals, groups or communities affected, or likely to be affected, by the proposed CDM project activity. (CDM-M&P, Paragraph 1(e)).

[56] CDM-M&P, Paragraph 37(b).

[57] "Project Participant" means a private and/or public entity authorized by a Party to participate, under the Party's responsibility, in CDM project activities. (Glossary of Terms used in the CDM Project Design Document).

[58] CDM-M&P, Paragraph 37(c). For example, in South Africa EIAs are required for a specified set of "listed activities" established in terms of national legislation. A South African CDM project intending to utilise the methane component of landfill gas for the commercial generation of electricity of at least 10 megawatts will require an EIA because the following are "listed activities": (i) construction, erection and upgrading of facilities for commercial electricity generation with an output of at least 10 megawatts; and (ii) construction, erection and upgrading of handling, processing or treatment facilities for any substance which is dangerous or hazardous and is controlled by national legislation, i.e., methane.

[59] CDM-M&P, Paragraph 40(a).

- They may be able to demonstrate certain sustainable development aspects of the proposed CDM project, which should facilitate the DNA's confirmation.
- If they contain a legal component they may identify other legal authorization requirements that must be complied with (See: "National Authorizations and Permissions", below).

### 5.5.2 National CDM project cycle

The DNA may require a *national project approval cycle for CDM projects* in addition to that established under the CDM-M&P. Ideally the two cycles should be dovetailed so as to reduce time delay and consequent increased costs. This may, however, not be the case.

### 5.5.3 National Authorizations and Permissions

The CDM project will also have to comply with the *Host's regulatory regime for the specific project activity*, e.g. authorizations for electricity generation from landfill gas. Depending on how the CDM investor's relationship with the project proponent is structured, the investor will have greater or lesser responsibility for such compliance. In fact, it would be to the investor's advantage to avoid shouldering this burden, particularly given that it is likely to require close interaction with the Host's administrative processes. In any event, this task is usually better suited to the project proponent that will, presumably, have knowledge of local systems and administrative processes. If this onus is placed on the CDM project proponent, e.g., in terms of a contract concluded between the parties for co-development of the CDM project, then the investor may want to include a penalty or termination provision for non-performance should these authorizations not be forthcoming as a result of some negligence on the part of the CDM project proponent.

## *5.6 Risk Mitigation*

Typically CDM-project risks (see chapter 4) should be regulated in terms of the contractual arrangements between parties, and examples of these arrangements are briefly discussed in the following section.

The strategy most readily available to the CDM investor is to reduce/mitigate risk via the contractual arrangements made between the parties to the CDM project. [60] In simple terms contracts can be regarded as mechanisms to apportion both responsibility for the performance of project-related tasks and risks associated with the project and are the means through which the investor may control its exposure and enhance its advantage. [61] The set of contractual relationships briefly

[60] For further detail on risk mitigation and management in CDM investment, particularly from the economic perspective, see Janssen, supra, Springer, supra, and Janssen, J, *Risk management of investments in Joint Implementation and Clean Development Mechanism projects*, Difo-Druck, Bamberg, 2001.

[61] For example, under the above heading "Possible CDM project operation risks", the following contractual arrangements might be concluded to mitigate risk. *Political risk*: e.g., ddestruction of project infrastructure due to political uprising or related local tensions - mitigated by MoU with Host country, international political risk insurance, commercial insurance and export credit guarantees, buy-in of local stakeholders. *Technological risk*: e.g., increasing construction and/or operating cost due to high technology - mitigated by concluding performance bonds and completion

considered below are those that may arise between a CDM investor and a CDM project proponent. [62]

### 5.6.1 Developmental investment in a CDM project coupled with a ERPA

For a Type 2(a) CDM investment, which exhibits both active and passive aspects, contractual arrangements between the parties might include: [63]

- A *Letter of Intent*. Generally speaking a Letter of Intent is simply an agreement to enter into a more detailed contractual relationship within a specified timeframe. The more detailed relationship may, for example, include the development of a CDM project aimed at generating CERs for which the investor retains the right of first refusal to purchase. In consideration for being accorded this right of first refusal the investor may undertake to provide certain financial and/or logistical support, perhaps up to a specified limit, for project development. The general nature of the CDM project could be described and confidentiality of the parties' proprietary information could be ensured. [64]

- A *Co-operation Agreement* (possibly analogous to a Joint Venture agreement). This procedure, which South African lawyers recommended on being used in South Africa in addition to the Letter of Intent (which in other countries is considered sufficient)[65] could set out *inter alia* the terms and extent of the investment including:
    - key developmental milestones for the project and the respective (and possibly evolving) roles of parties as each of the milestones be attained,
    - allocation of responsibility for the performance of certain tasks, the assumption of certain risks in attaining milestones, and penalties for non-performance of tasks or non-attainment of milestones,

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guarantees with suppliers, contractors and sub-contractions, incorporating incentives into contracts for timely completion of tasks. *Economic risk*: e.g., changing CER prices - mitigated by locking in future CER prices through financial derivatives. *SHE risk*: e.g., contamination of project site prior to implementation of project, or sub-contractor's violation of environmental authorisation requirements - mitigated by indemnity clauses in contracts or environmental risk insurance. *Qualification risk*: e.g., fewer than expected verified and certified CERs than is technically achievable, or delays in certification resulting in fewer than expected CERs – mitigated by specialised emissions reduction insurance. (Adapted from Van den Berg, J, and Friedenthal, J., supra.).

[62] Other contractual relationships that may arise from the requirements of the CDM project cycle include: (i) with the DOEs responsible for validation of the project and subsequent monitoring and verification of the CERs generated; and, (ii) with specialist consultants, e.g., environmental consultants conducting EIA and/or public participation processes, or technical consultants conducting project feasibility analyses. Depending on the specific CDM project activity, further contractual relationships might arise, e.g.: (iii) with power utilities for provision of power generated by the CDM project from landfill gas or a renewable energy source; or, (iv) with a gas utility for sale of landfill gas for on-selling to third parties, or (v) with an incineration utility for provision of methane for heat generation. A consideration of these relationships is beyond the scope of this Chapter.

[63] Note: (i) This suite of agreements is only one example of a foundation for a CDM investment. Actual choices made by investors will depend *inter alia* on specific legal advice in this regard, and the balance of convenience to the respective parties as well as time and cost constraints. (ii) The contents of these agreements are open to debate and variation according to the requirements of the parties.

[64] Note that the CDM-M&P, Paragraph 6, provides that information used to determine additionality, baseline methodology and its application and to support EIA, shall not be considered as proprietary or confidential in the CDM project cycle. Consequently, notwithstanding any confidentiality agreement between the investor and the project proponent, the CDM-M&P Paragraph 6 exclude certain information from bearing such status.

[65] Kammeradvokaten in Denmark has prepared model Letter of Intent and model ERPA, considering these sufficient.

- the degree and type of investment (monetary value and/or in-kind services), [66]
- timeframes for and method of delivery of the investment,
- general daily "housekeeping" issues, e.g., access to the site where the project activity is being conducted,
- amount of CERs expected to be produced by the CDM project and the price range, perhaps providing that the final price be linked to the prevailing market price at time of delivery, as set-off against the value of the investment, [67]
- insurance of the CDM project infrastructure and the potential outcomes of the CDM project, and responsibility for securing such insurance,
- reserving a right to the investor for ongoing monitoring of the operational phase of the project once the Agreement has come to an end,
- the timeframe within which the ERPA will be negotiated, and
- the expiration of the Agreement, e.g., on the occurrence of an event such as the registration of the CDM project by the Executive Board. [68]

- An *Emission Reduction Purchase Agreement, ERPA*. A number of excellent discussion documents on the drafting and content of agreements for the purchase and sale of emissions reductions credits are available. It is strongly recommended that potential investors and/or their lawyers consult some of these in order to gain an insight into the complexities associated with such agreements. (See, for example, the website of the International Emissions Trading Association at: www.ieta.org ). In addition the development of standard-form ERPAs will assist in bringing down transaction costs and the development of such standard-form contracts should be closely monitored by investors. Issues that arise in relation to ERPAs generally include:
  - Ownership of the CERs – the project proponent should be able to warrant that it holds title to the CERs generated by the project,
  - Ownership or long-term title to the land upon which the CDM project is being carried out; and,
  - Measurement, Delivery of and Payment for CERs.

A distinction that can be made between the Co-operation Agreement and the ERPA in the above example is that while the former seeks to determine the parameters of the developmental portion of the CDM investment (the so-called 'active' portion), the latter regulates the 'passive' portion of investor involvement.

[66] The question here is whether the investment will be in the form of developmental funding (accompanied with the appropriate safeguards on utilization thereof), or whether it will consist, wholly or partly, of 'in-kind' services. An example of this latter scenario might be where the investor contracts with certain consultants for the provision of services required by the CDM project, e.g., feasibility studies or EIA processes. Note that in the event of litigation between the parties, which may require the investor to prove an amount of damages suffered, it will be important to provide for a mechanism to determine the value of the investment.

[67] Note that these provisions will also form part of the ERPA and the preference might be not to include them in the Co-operation (Joint Venture) Agreement.

[68] This expiry can be seen as the end of the investor's 'active' involvement in the project and the replacement thereof by a 'passive' involvement as a CER-purchaser.

### 5.6.2 Miscellaneous issues in regard to contracts

Note that the Executive Board will levy an administration fee on CERs issued, and that 2% of issued CERs will go the Adaptation Fund. [69] In addition the Host country, probably via the DNA, might charge a royalty on CERs generated.

The international NGO community is deeply interested in CDM, usually from the perspective of ensuring that CDM projects are implemented correctly and with attention to its public participation, environmental assessment and sustainable development components. A more specific concern of some NGOs is that the CDM represents the danger of repatriation, to the Annex I country, of profits from CERs generated in the Non-Annex I country. Parties to a CDM project might seek to mitigate this situation by structuring their agreement to allow the investor to gain value exclusively in CERs, while operating profits from the CDM project (i.e., profit from normal business activities) and a portion of CER's, accrue to the project proponent for the possible benefit of the local community.

It is essential to include general contractual safeguards, particularly in the Co-operation Agreement and the ERPA, e.g., a statement of the law that governs the contract, indemnities, dispute resolution, assignment, *force majeure*, confidentiality (to the degree possible, see footnote 68), penalties for non-performance, warranties, breach and termination.

In an active investment scenario the investor and CDM project proponent must have clear agreement on where responsibility lies for project development. *Example:* After initial negotiations the CDM project proponent may be under the impression that the investor is prepared to take responsibility for the full cost and logistics of project development. If this is not the case then the areas of responsibility that the investor is prepared to assume must be clarified at the outset, as should the corresponding responsibilities of the CDM project proponent. This will alleviate later disagreement which could result in delays, increased project costs, and one or both parties having to commit to greater financial or 'in-kind' exposure than originally intended.

### 5.6.3 Further issues for consideration

The CDM regime is new, fairly complex and still in a "learning-by-doing" phase. It is important to seek assistance from consultants who have experience in these matters, and to ensure that all parties are aware of how the process operates. *Example:* The CDM-M&P require that where a new monitoring and baseline methodology is to be used by a CDM project this methodology must first be approved by the Executive Board. [70] This approval requires a separate cycle of document preparation, submission, assessment and approval - different from that required for Validation and Registration of the CDM project proper. To avoid confusion the distinction between these two processes must be noted. [71]

[69] Both actions as contemplated by Kyoto, Article 12(8).
[70] CDM-M&P, paragraph 38.
[71] As more monitoring and baseline methodologies are approved by the Executive Board the extra step required to approve new methodologies will be come less important as subsequent projects, with requirements similar to those with approved methodologies, are simply permitted to use the existing methodologies.

Knowledge of the Host country context is important. Examples are*:*

- An internationally-based DOE might, in reading the environmental assessment provisions of the CDM-M&P, come to the conclusion that an EIA is not required for a particular project and be prepared to validate a project without an EIA being performed. However, the CDM-M&P are clear that if the Host country so requires then an EIA must be conducted. An assessment of whether an EIA is required is probably best conducted by a local consultant (probably an environmental-legal consultant) with knowledge of the Host country's environmental legislation and of the CDM-M&P.

- The Host country may have a number of authorization requirements, at different levels of government, e.g., national, provincial and municipal, that must be applied for and awarded prior to the commencement of activities associated with the CDM project. This is especially the case in Host countries with well developed legal systems. In these instances local knowledge of authorization requirements and processes will be important to the success of the CDM project.

### 5.6.4 Miscellaneous recommendations

- Be in close contact with the Danish Embassy in the Host Country for information on specific local issues.
- Stay in contact with Danish office responsible for CDM and seek their advice on the best locations for investments.
- Be aware that the area of climate change is fraught with a number of divergent opinions, e.g., on the level of the threat posed to the globe, or on the relative value of different mitigation actions. It is unwise to assume that a strongly-worded deprecation of the Kyoto Protocol by a government official is the last word on the subject. This is particularly so in light of the political agendas which drive some of these opinions, e.g., the United States' current stance is drive by the incumbent administration's attitude that mitigation should occur simply by way of research into and implementation of new technology, rather than the processes implemented by Kyoto. Read as widely as possible to gain an insight into the various shades of the debate.
- The Kyoto flexible mechanisms require a strong link between environmental considerations and commercial imperatives. The Kyoto Protocol can be regarded as the first international agreement which attempts to solve an environmental problem (climate change) with a commercial solution. This link raises issues that might not usually appear in the commercial sector, e.g., sustainable development, public participation and environmental assessment. The investor should be aware of these issues and particularly how they are perceived in a particular Host country. It is possible that these issues will be viewed with some sensitivity in Non-Annex I countries. Investors should also note that paying the requisite attention to such matters is likely to result in increased project development costs, and these should be provided for when project feasibilities are conducted.
- Stay up-to-date with developments in all the areas that impact on the generation and acquisition of CERs, e.g.,
    - amendments to the CDM-M&P, and
    - developments in the drafting of carbon contracts, and

- developments in the EU-ETS and other emissions trading schemes - especially developments in the proposed link between the CDM and the EU ETS and linkages between national trading schemes that may lead to trading, between schemes, of emissions reduction credits generated under different regimes.